

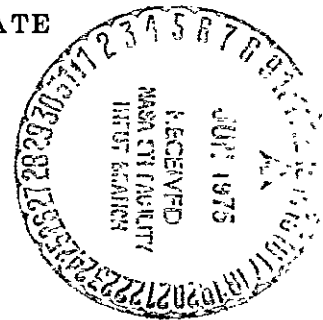
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# Systems Cost/Performance Analysis (Study 2.3) Final Report

Volume II, Appendix A: Data Base

Prepared by  
ADVANCED MISSION ANALYSIS DIRECTORATE  
Advanced Orbital Systems Division

27 September 1974



Prepared for  
OFFICE OF MANNED SPACE FLIGHT  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
Washington, D.C. 20546

Contract No. NASW-2575



Systems Engineering Operations

THE AEROSPACE CORPORATION

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SYSTEMS COST/PERFORMANCE ANALYSIS (STUDY 2.3)  
FINAL REPORT

Volume II, Appendix A: Data Base

Prepared by  
Advanced Mission Analysis Directorate  
Advanced Orbital Systems Division

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THE AEROSPACE CORPORATION  
El Segundo, California

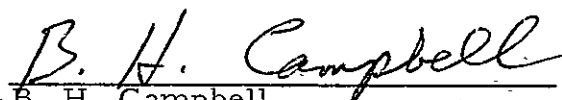
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SYSTEMS COST/PERFORMANCE ANALYSIS  
(STUDY 2.3) FINAL REPORT  
Volume II, Appendix A: Data Base

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## FOREWORD

This report documents The Aerospace Corporation effort on Study 2.3, Systems Cost/Performance Analysis, performed under NASA Contract NASW-2575 during Fiscal Year 1974. The effort was directed by Mr. B. H. Campbell. Mr. R. D. Kramer, Marshall Space Flight Center and Mr. R. R. Carley, NASA Headquarters were the NASA Study Directors for this study. Their efforts in providing technical direction throughout the duration of the study are greatly appreciated.

This volume is one of three volumes of the final report for Study 2.3. The three volumes are:

Volume I	Executive Summary
Volume II	Systems Cost/Performance Model
Appendix	Data Base
Volume III	Programmer's Manual and User's Guide

Volume I summarizes the overall report. It includes the relationship of this study to other NASA efforts, significant results, study limitations, and suggested additional effort.

Volume II provides a detailed description of the Systems Cost/Performance Model. It also includes the model checkout and the results for three payload test cases. The Data Base is provided in the Appendix to Volume II.

Volume III provides a detailed description of how the Systems Cost/Performance Computer Program is organized and operates. The program listing, detailed flow charts and user restrictions are included.

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## ACKNOWLEDGMENTS

The Aerospace Corporation effort on Study 2.3 was supported by Members of the Technical Staff (MTS) in various technical disciplines within the company. The contributions of the following MTS to the System Cost/Performance Analysis are gratefully acknowledged:

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## 1. INTRODUCTION

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This appendix contains data on selected payload equipments (components) which have been collected for the purpose of exercising the Systems Cost/Performance Model. The reader should be aware that, although most of the data is accurate, approximations based on engineering judgment and experience are used wherever actual data was unavailable. The approximations are justified by the objective of the study which was to develop a cost/performance model. Assuming that the model is successfully developed and is accepted for use by a body of users, the data base should be expanded and the approximations replaced by actual data. The following paragraphs are devoted to an explanation of how the data are organized and how to interpret the information contained on the data pages.

The equipments are organized according to the following subsystems which use the specific components:

- a. Stabilization and Control
- b. Auxiliary Propulsion
- c. Data Processing
- d. Communication
- e. Electrical Power

The data sheet for each component states which subsystem utilizes the component, which configurations require the component, which equipment type the component is categorized as, and the data base identifier or code number assigned to the component.

The data describing the component consist of the following four types:

- a. Performance
- b. Safety
- c. Cost
- d. Schedule

## 1.1. PERFORMANCE DATA

The performance data are separated into eight categories:

- a. Technical Characteristics
- b. Power
- c. Weight
- d. Volume
- e. Vibration
- f. Temperature
- g. Pressure
- h. CDPI

The technical characteristics are peculiar to each equipment type. Generally speaking, the technical characteristics provide the data required to select or differentiate among the components and additional data for the component which, if selected, provides information for design of the remainder of the subsystem.

The power data includes three basic descriptions: the power requirements, the voltage requirements, and the conversion requirements. The average power is the average power required by the component during its active state. The maximum power is the power required either during load conditions or during any high power transient periods. The minimum voltage requirement exists during quiescent periods, powered down periods, or the turned-off condition, if allowable.

The voltage requirements are the specifications for which the equipment is rated, i. e., the nominal voltage, and the maximum and minimum voltages for which the component will continue to perform within specifications.

If the specific component is selected, the converter/inverter requirement flag identifies any need for special power conversion equipment. Since the requirement is identified as a flag, the number used should correspond to the identifier for the actual converter or inverter required.



The component weight includes all weight which is essential to performing the functions associated with the component. Examples of additional functional weight include:

- a. Telemetry instrumentation
- b. Failure sensing and switching
- c. Interface equipment which is not ordinarily a separate component as selected by the Systems Cost/Performance Model.

Weight which comes under different functional descriptions is not included. Examples are:

- a. Wiring harness
- b. Structural mountings

Volume is the direct counterpart of weight and is determined according to the same rules.

The vibration specification includes both random and nonrandom categories. Although vibration is not used in the FY 74 Model, the intent is to use the specification in future models.

The maximum and minimum temperature information are the temperature specifications for which the equipment is qualified.

The pressure information is the ambient pressure for which the component is qualified.

The CDPI information for each component is used for the express purpose of designing the Data Processing and Communication Subsystems. Command requirements are divided into three categories: power, time tagged, and other. The telemetry requirements are separated into two categories, i.e., low rate and high rate telemetry requirements. The telemetry information includes:

- a. Number of analog telemetry points
- b. Number of digital telemetry points
- c. Sample rate
- d. Word length

## 1.2 SAFETY DATA

The intent in supplying the safety information is to indicate the failure mode, the numerics describing the failure mode, the redundancy type, and the maximum amount of redundancy. To this end, the failure model as stated in the data base indicates both the failure mode and the redundancy type. If the failure mode is modeled by an exponential, then the failure rate must be provided. Both the mean and standard deviation are supplied in the event of a normal (gaussian) failure mode. The dormancy factor must be provided for either failure mode. Because the Systems Cost/Performance Model can add an undesirable (from an engineering point of view) amount of redundancy, the total allowable number of redundant elements is specified. This redundancy number includes both the original number of components as well as the components added for the purpose of increasing system reliability.

## 1.3 COST DATA

Component cost information must be supplied for each of the following three categories:

- a. Design engineering
- b. Test and evaluation
- c. Unit production

An additional piece of information which must be provided is the reference quantity required to meet the performance requirements. Redundancy is not included in the reference quantity. A nondimensional factor has been provided for use in future models where the effect of standardization or use of off-the-shelf hardware is to be incorporated.

## 1.4 SCHEDULE DATA

Component schedule data includes both the development lead time and the qualification lead time. Each lead time is separated into a constant and a variable. Normally, the constant lead times will be exactly the same

for all components of the same type. In addition, a state-of-art factor is provided based on the component being in a state of development somewhere between off-the-shelf and a new concept requiring an advance in technology.

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## 2. EQUIPMENT DATA

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Subsystem: S&C (0101)

Configurations: Dual Spin

Equipment Type: Despin Mechanical Assembly

#### Performance

##### Technical Characteristics

- (1) Bearing and motor friction ( $3\sigma$ ): 1.1 mrad (0.064 deg)
- (2) Bearing runout ( $3\sigma$ ): 0.21 mrad (0.012 deg)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	2.0
Maximum Power (watts):	88.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 9.87 (21.75 lb)

Volume (cc):  $1.78 \times 10^4$  (0.627 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	322 (120° F)
Minimum (°K):	266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 1

High Rate Telemetry

Analog Points (No.): 4

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.): 12

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 400

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 1000.0

Test and Evaluation (\$1000): 300.0

Unit Production (\$1000): 70.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.6

Development Lead Time Variable (months): 2.8

Qualification Lead Time Constant (months): 0.9

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: S&C (Included in 0101)

Configurations: Dual Spin

Equipment Type: Despin Electronics Assembly

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	6.24
Maximum Power (watts):	9.5
Minimum Power (watts):	3.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 3.9 (8.5 lb)

Volume (cc):  $8.5 \times 10^3$  (0.30 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 275 (35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	3
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	1
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	0.0075
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	13,700
Standard Deviation ( $\times 10^{+9}$ hr):	.
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	320.0
Test and Evaluation (\$1000):	206.0
Unit Production (\$1000):	92.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	1.1
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (0202)

Configurations: All

Equipment Type: Valve Driver Assembly  
(3 assemblies for 6 valves)

Performance

Technical Characteristics

(1) Number of valves: 6

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

Power

Average Power (watts): 0.12

Maximum Power (watts): 27.0

Minimum Power (watts): 0

Nominal Voltage (volts): -28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 1.9 (4.2 lb)

Volume (cc):  $1.2 \times 10^4$  (0.42 ft<sup>3</sup>)

Vibration

Random (g, rms)

Non-Random (g):

Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.): 3

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

#### Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 966

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 164.0

Test and Evaluation (\$1000): 15.0

Unit Production (\$1000): 21.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.6

Development Lead Time Variable (months): 2.0

Qualification Lead Time Constant (months): 3.0

Qualification Lead Time Variable (months): 0.7

State-of-Art Factor (N.D.): 1.0

Subsystem: S&C (0302)

Configurations: All

Equipment Type: Sun Sensor Assembly (with electronics)

## Performance

### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 1.0  
Maximum Power (watts): 1.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.545 (1.2 lb)

Volume (cc):  $6.2 \times 10^3$  (0.22 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 275 (35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.): 5

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 2499

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 290.0

Test and Evaluation (\$1000): 173.0

Unit Production (\$1000): 8.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months) 8.0

Development Lead Time Variable (months) 2.0

Qualification Lead Time Constant (months) 8.4

Qualification Lead Time Variable (months) 0.4

State-of-Art Factor (N.D.): 1.0



Subsystem: S&C (0401)  
Configurations: Dual Spin  
Equipment Type: Nutation Damper

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 0  
Maximum Power (watts): 0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 0  
Maximum Voltage (volts): 0  
Minimum Voltage (volts): 0

Converter/Inverter  
Requirement (flag):

Weight (kg): 1.8 (4.0 lb)  
Volume (cc):  $2 \times 10^4$  (0.8 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 172

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

### Cost

Design Engineering (\$1000): 155.0

Test and Evaluation (\$1000): 25.0

Unit Production (\$1000): 9.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 5.4

Development Lead Time Variable (months): 2.3

Qualification Lead Time Constant (months): 2.2

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: S&C (0501)

Configurations: Dual Spin

Equipment Type: Gimbal Electronics Assembly

## Performance

### Technical Characteristics

(1) Resolver accuracy ( $3\sigma$ ): 0.51 mrad (0.029 deg)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

### Power

Average Power (watts): 3.5

Maximum Power (watts): 5.0

Minimum Power (watts): 2.0

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 2.83 (6.25 lb)

Volume (cc):  $7.9 \times 10^3$  (0.28 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum ( $^{\circ}$ K): 311 (100 $^{\circ}$  F)

Minimum ( $^{\circ}$ K): 275 (35 $^{\circ}$  F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	6
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	1
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	0.0075
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	2430
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	0	} mission equipment
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	3.8
Qualification Lead Time Variable (months):	0.4
State-of-Art Factor (N.D.):	1.2

Subsystem: S&C (0601)  
Configurations: Dual Spin  
Equipment Type: Control Timing Assembly  
Performance

Technical Characteristics

- |   |                       |
|---|-----------------------|
| (1) Programmer sine wave (3 $\sigma$ ):         | 0.93 mrad (0.053 deg) |
| (2) Drive quantization and delay (3 $\sigma$ ): | 0.87 mrad (0.050 deg) |
| (3) Measurement compensation (3 $\sigma$ ):     | 0.17 mrad (0.010 deg) |
| (4) Pipper drift (3 $\sigma$ ):                 | 0.31 mrad (0.018 deg) |
| (5) Quantization noise (3 $\sigma$ ):           | 0.12 mrad (0.007 deg) |
| (6)   |                       |
| (7)   |                       |
| (8)   |                       |
| (9)   |                       |
| (10)  |                       |

Power

Average Power (watts):	3.5
Maximum Power (watts):	5.0
Minimum Power (watts):	2.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	3.4 (7.4 lb)
Volume (cc):	$1.04 \times 10^4$ (0.367 ft <sup>3</sup> )

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum ( $^{\circ}$ K):	311 (100 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	275 ( 35 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	5
Time Tagged Commands (No.):	
Other Commands (No.):	30
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	8
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	0.0075
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,582
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	651.0
Test and Evaluation (\$1000):	440.0
Unit Production (\$1000):	112.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.0
Development Lead Time Variable (months):	3.4
Qualification Lead Time Constant (months):	5.5
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (0701)  
Configurations: Dual Spin  
Equipment Type: Bi-Axial (Gimbal) Drive Assembly  
(two required per antenna)  
Performance

#### Technical Characteristics

- (1) Drive quantization ( $3\sigma$ ): 0.28 mrad (0.016 deg)
- (2) Gimbal drive error ( $3\sigma$ ): 0.44 mrad (0.025 deg)
- (3) Bi-ax droop error ( $3\sigma$ ): 0.31 mrad (0.018 deg)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts):	2.8
Maximum Power (watts):	5.6
Minimum Power (watts):	1.4
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg):	6.44 (14.2 lb)
Volume (cc):	$9.9 \times 10^3$ (0.35 ft <sup>3</sup> )

#### Vibration

Random (g, rms):  
Non-Random (g):

#### Temperature

Maximum ( $^{\circ}$ K):	322 (120 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	266 (20 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 2

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 4

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 650

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

## Cost

Design Engineering (\$1000):

Test and Evaluation (\$1000):

Unit Production (\$1000):

Reference Quantity (No.):

Factor (N.D.):

0  
0  
0  
1  
1

mission equipment

## Schedule

Development Lead Time Constant (months): 7.5

Development Lead Time Variable (months): 3.2

Qualification Lead Time Constant (months): 3.9

Qualification Lead Time Variable (months): 0.4

State-of-Art Factor (N.D.): 1.2



Subsystem: S&C (0801)

Configurations: Dual Spin

Equipment Type: Non-Scanning Earth Sensor Assembly  
(with electronics)

Performance

#### Technical Characteristics

- |  |                       |
|--|-----------------------|
| (1) Sensor noise ( $3\sigma$ ):          | 4.42 mrad (0.253 deg) |
| (2) Radiance irregularity ( $3\sigma$ ): | 0.52 mrad (0.030 deg) |
| (3) Quantization error ( $3\sigma$ ):    | 0.12 mrad (0.007 deg) |
| (4) Sun interference ( $3\sigma$ ):      | 0.35 mrad (0.020 deg) |
| (5) Moon interference ( $3\sigma$ ):     | 0.87 mrad (0.050 deg) |
| (6) Threshold aging ( $3\sigma$ ):       | 0.56 mrad (0.032 deg) |
| (7)                                      |                       |
| (8)                                      |                       |
| (9)                                      |                       |
| (10)                                     |                       |

#### Power

Average Power (watts):	0.6
Maximum Power (watts):	0.9
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	3.5 (7.7 lb)
Volume (cc):	790 (0.028 ft <sup>3</sup> )

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum ( $^{\circ}$ K):	311 (100 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	275 (35 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

Performance (continued)

CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 14

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 4

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 3212

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

Cost

Design Engineering (\$1000): 66.0

Test and Evaluation (\$1000): 105.0

Unit Production (\$1000): 33.0

Reference Quantity (No.): 2

Factor (N.D.): 1

Schedule

Development Lead Time Constant (months): 1.6

Development Lead Time Variable (months): 2.5

Qualification Lead Time Constant (months): 9.4

Qualification Lead Time Variable (months): 4.7

State-of-Art Factor (N.D.): 1.0

Subsystem: S&C (0201)

Configurations: All

Equipment Type: Valve Driver Assembly

## Performance

### Technical Characteristics

- (1) Number of valves: 12
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 36.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 22.0

### Converter/Inverter

Requirement (flag): C 01 (1401)

Weight (kg): 0.73 (1.6 lb)

Volume (cc):  $1.4 \times 10^3$  (0.05 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	8
High Rate Telemetry	
Analog Points (No.):	13
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	4
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1910
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	39.0
Test and Evaluation (\$1000):	28.0
Unit Production (\$1000):	10.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	2.6
Development Lead Time Variable (months):	0.2
Qualification Lead Time Constant (months):	3.0
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (0301)  
Configurations: All  
Equipment Type: Sun Sensor Assembly (with electronics)  
(single axis)  
Performance

Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): 1.0  
Maximum Power (watts): 1.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.39 (0.85 lb)  
Volume (cc): 280 (0.01 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 255 ( 0° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.)	
Time Tagged Commands (No.):	
Other Commands (No.):	4
High Rate Telemetry	
Analog Points (No.):	7
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1500
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	6

### Cost

Design Engineering (\$1000):	230.0
Test and Evaluation (\$1000):	150.0
Unit Production (\$1000):	20.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.0
Development Lead Time Variable (months):	4.9
Qualification Lead Time Constant (months):	8.4
Qualification Lead Time Variable (months):	1.5
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1001)

Configurations: Yaw Spin

Equipment Type: Control Electronics Assembly

## Performance

### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6) Controller error ( $3\sigma$ ): 1.789 mrad (0.1025 deg)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts):	4.0
Maximum Power (watts):	4.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	22.0
Converter/Inverter Requirement (flag):	C 01 (1401)

Weight (kg): 4.14 (9.12 lb)

Volume (cc):  $2.5 \times 10^4$  (0.9 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum ( $^{\circ}$ K): 322 (120<sup>o</sup> F)

Minimum ( $^{\circ}$ K): 266 ( 20<sup>o</sup> F)

Pressure (kg/m<sup>2</sup>):

DPI	
Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	9
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	13
Low Rate Telemetry	
Analog Points (No.):	23
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	14
by	
failure Model (flag):	1
failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	10,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
total Redundant Elements (No.):	4
Design Engineering (\$1000):	750.0
Test and Evaluation (\$1000):	500.0
Unit Production (\$1000):	130.0
Reference Quantity (No.):	2
Factor (N.D.):	1
Module	
Development Lead Time Constant (months):	11.0
Development Lead Time Variable (months):	9.3
Qualification Lead Time Constant (months):	5.5
Qualification Lead Time Variable (months):	1.2
State-of-Art Factor (N.D.):	1.5



Subsystem: S&C (1101)  
Configurations: Yaw Spin  
Equipment Type: Rate Gyro Assembly

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 12.0  
Maximum Power (watts): 18.0  
Minimum Power (watts): 6.0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag): C 01 (1401)

Weight (kg): 1.47 (3.23 lb)

Volume (cc):  $2.4 \times 10^3$  (0.086 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	1
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{-7}$ hr):	11,941
Standard Deviation ( $\times 10^{+9}$ hr):	1.0
Dormancy Factor (N.D.):	3
Total Redundant Elements (No.):	

### Cost

Design Engineering (\$1000):	285.0
Test and Evaluation (\$1000):	118.0
Unit Production (\$1000):	52.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.9
Development Lead Time Variable (months):	3.4
Qualification Lead Time Constant (months):	3.9
Qualification Lead Time Variable (months):	0.4
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1201)

Configurations: All except Dual Spin

Equipment Type: Horizon Sensor (with electronics)  
(Planar scan type)

Performance

#### Technical Characteristics

- (1) Sensor noise ( $3\sigma$ ): 4.36 mrad (0.250 deg)
- (2) Radiance irregularity ( $3\sigma$ ): 2.62 mrad (0.150 deg)
- (3) Quantization error ( $3\sigma$ ): 0.44 mrad (0.025 deg)
- (4) Sun interference ( $3\sigma$ ):
- (5) Moon interference ( $3\sigma$ ):
- (6) Threshold aging ( $3\sigma$ ):
- (7) Null or bias error ( $3\sigma$ ):
- (8) Maximum output frequency: 1.256 rad/sec
- (9)
- (10)

#### Power

Average Power (watts):	5.5
Maximum Power (watts):	8.0
Minimum Power (watts):	2.5
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	C 01 (1401)

Weight (kg): 2.87 (6.33 lb)

Volume (cc):  $4.2 \times 10^3$  (0.15 ft<sup>3</sup>)

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum ( $^{\circ}$ K):	311 (100 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	255 ( 0 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.)	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	.25
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	5166
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	1250.0
Test and Evaluation (\$1000):	355.0
Unit Production (\$1000):	105.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.6
Development Lead Time Variable (months):	9.9
Qualification Lead Time Constant (months):	9.4
Qualification Lead Time Variable (months):	4.2
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1301)  
Configurations: Yaw Spin. and ME with Momentum. Wheel  
Equipment Type: Reaction Wheel Assembly (with electronics)

#### Performance

##### Technical Characteristics

- (1) Nominal momentum: 42.58 m-kg-sec (308.0 ft-lb-sec)
- (2) Maximum momentum: 51.10 m-kg-sec (369.6 ft-lb-sec)
- (3) Minimum momentum: 34.07 m-kg-sec (246.4 ft-lb-sec)
- (4) Nominal speed: 3000 rpm
- (5) Maximum speed: 3600 rpm
- (6) Minimum speed: 2400 rpm
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 19.6  
Maximum Power (watts): 125.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 33.0  
Minimum Voltage (volts): 21.5

##### Converter/Inverter

Requirement (flag): C 01 (1401)

Weight (kg): 35.54 (78.35 lb)  
Volume (cc):  $7.1 \times 10^4$  (2.5 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 316 (110° F)  
Minimum (°K): 272 ( 30° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): 1

Time Tagged Commands (No.):

Other Commands (No.): 1

#### High Rate Telemetry

Analog Points (No.): 5

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 125

Word Length (bits): 8

#### Low Rate Telemetry

Analog Points (No.): 7

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 500

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

### Cost

Design Engineering (\$1000): 430.0

Test and Evaluation (\$1000): 390.0

Unit Production (\$1000): 122.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 7.1

Development Lead Time Variable (months): 3.0

Qualification Lead Time Constant (months): 3.2

Qualification Lead Time Variable (months): 0.4

State-of-Art Factor (N.D.): 1.0

Subsystem: S&C (1401)  
Configurations: All  
Equipment Type: Power Converter  
Performance

Technical Characteristics

- (1) Special requirement code: C 01  
(2)  
(3)  
(4)  
(5)  
(6)  
(7)  
(8)  
(9)  
(10)

Power

Average Power (watts): 10.6  
Maximum Power (watts): 15.0  
Minimum Power (watts): 7.5  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 22.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 2.31 (5.09 lb)  
Volume (cc):  $5.1 \times 10^3$  (0.18 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):	7
Time Tagged Commands (No.):	
Other Commands (No.):	3
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	7
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	4033
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

## Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months):	7.4
Development Lead Time Variable (months):	3.2
Qualification Lead Time Constant (months):	2.5
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0



Subsystem: S&C (1501)

Configurations: : Mass Expulsion

Equipment Type: Attitude Reference Electronics  
(3 axis gyrocompassing)

Performance

#### Technical Characteristics

(1) Pitch horizon scanner gain:	$0.01667 \text{ sec}^{-1}$
(2) Roll horizon scanner gain to roll axis:	$0.00556 \text{ sec}^{-1}$
(3) Roll horizon scanner gain to yaw axis:	$0.01667 \text{ sec}^{-1}$
(4) Pitch feedback gain:	$0.01667 \text{ sec}^{-1}$
(5) Roll feedback gain:	$0.00556 \text{ sec}^{-1}$
(6) Roll to yaw coupling gain:	$0.01667 \text{ sec}^{-1}$
(7)	
(8)	
(9)	
(10)	

#### Power

Average Power (watts):	4.0
Maximum Power (watts):	6.0
Minimum Power (watts):	2.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 4.5 (10.0 lb)

Volume (cc):  $2.8 \times 10^4$  (1.0 ft<sup>3</sup>)

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum (<sup>o</sup>K): 322 (120<sup>o</sup> F)

Minimum (<sup>o</sup>K): 266 ( 20<sup>o</sup> F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	9
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	13
Low Rate Telemetry	
Analog Points (No.):	23
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	14

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	10,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	800.0
Test and Evaluation (\$1000):	530.0
Unit Production (\$1000):	137.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.0
Development Lead Time Variable (months):	9.5
Qualification Lead Time Constant (months):	5.5
Qualification Lead Time Variable (months):	1.3
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1601)

Configurations: All

Equipment Type: Valve Driver Assembly

## Performance

### Technical Characteristics

- (1) Number of valves: 6
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 1.0  
Maximum Power (watts): 12.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.73 (1.6 lb)

Volume (cc):  $4.5 \times 10^3$  (0.16 ft<sup>3</sup>)

### Vibration

Random (g, rms):  
Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	8
High Rate Telemetry	
Analog Points (No.):	13
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	4
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1900
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	40.0
Test and Evaluation (\$1000):	30.0
Unit Production (\$1000):	10.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	2.6
Development Lead Time Variable (months):	1.1
Qualification Lead Time Constant (months):	3.0
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1701)

Configurations: All Mass Expulsion Configurations

Equipment Type: Rate Integrating Gyro Assembly (with electronics)  
(3 gyros per assembly)

Performance

#### Technical Characteristics

- (1) G-insensitive gyro drift( $3\sigma$ ):  $2.43 \times 10^{-3}$  mrad/sec (0.000139 deg/sec)
- (2) Total misalignment relative to vehicle ( $3\sigma$ ):  $0.87 \times 10^{-3}$  mrad (0.05 deg)
- (3) Gyro scale factor error (N.D):  $0.02 \times 10^{-3}$  (0.001)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts):	18.0
Maximum Power (watts):	27.0
Minimum Power (watts):	9.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg):	6.8 (15.0 lb)
Volume (cc):	$8.5 \times 10^3$ (0.3 ft <sup>3</sup> )

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum ( $^{\circ}$ K):	311 (100 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	278 (40 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	742.0
Test and Evaluation (\$1000):	355.0
Unit Production (\$1000):	151.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	10.5
Development Lead Time Variable (months):	4.5
Qualification Lead Time Constant (months):	8.3
Qualification Lead Time Variable (months):	0.9
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1702)

Configurations: All Mass Expulsion Configurations

Equipment Type: Rate Integrating Gyro Assembly (with electronics)

## Performance

### Technical Characteristics

- |      |   |  |
|------|---|--|
| (1)  | G-insensitive gyro drift ( $3\sigma$ ):               | $2.41 \times 10^{-4}$ mrad/sec (0.0000138 deg/sec) |
| (2)  | Total misalignment relative to vehicle ( $3\sigma$ ): | 0.87 mrad (0.05 deg)                               |
| (3)  | Gyro scale factor error (N.D.):                       | 0.002 (0.0001)                                     |
| (4)  |   |  |
| (5)  |   |  |
| (6)  |   |  |
| (7)  |   |  |
| (8)  |   |  |
| (9)  |   |  |
| (10) |   |  |

### Power

Average Power (watts):	27.0
Maximum Power (watts):	36.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 10.4 (23.0 lb)

Volume (cc):  $1.2 \times 10^4$  (0.41 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum ( $^{\circ}$ K): 311 (100 $^{\circ}$  F)

Minimum ( $^{\circ}$ K): 278 (40 $^{\circ}$  F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	970.0
Test and Evaluation (\$1000):	480.0
Unit Production (\$1000):	205.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	10.5
Development Lead Time Variable (months):	3.0
Qualification Lead Time Constant (months):	8.3
Qualification Lead Time Variable (months):	0.6
State-of-Art Factor (N.D.):	1.0



Subsystem: S&C (1801)

Configurations: All except Dual Spin

Equipment Type: Horizon Sensor (with electronics)

Performance

#### Technical Characteristics

(1) Sensor noise ( $3\sigma$ ):	4.36 mrad (0.250 deg)
(2) Radiance irregularity ( $3\sigma$ ):	0.52 mrad (0.030 deg)
(3) Quantization error (deg, $3\sigma$ ):	
(4) Sun interference ( $3\sigma$ ):	0.35 mrad (0.020 deg)
(5) Moon interference ( $3\sigma$ ):	0.87 mrad (0.050 deg)
(6) Threshold aging ( $3\sigma$ ):	0.56 mrad (0.032 deg)
(7) Null or bias error (deg, $3\sigma$ ):	
(8) Maximum output frequency:	1.256 rad/sec
(9)	
(10)	

#### Power

Average Power (watts):	15.0
Maximum Power (watts):	20.0
Minimum Power (watts):	10.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg):	9.1 (20.0 lb)
Volume (cc):	$5.7 \times 10^4$ (2.0 ft <sup>3</sup> )

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum ( $^{\circ}$ K):	311 (100 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	255 ( 0 $^{\circ}$ F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	10,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	2210.0
Test and Evaluation (\$1000):	760.0
Unit Production (\$1000):	250.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.6
Development Lead Time Variable (months):	14.7
Qualification Lead Time Constant (months):	9.4
Qualification Lead Time Variable (months):	7.6
State-of-Art Factor (N.D.):	1.0

Subsystem: S&C (1901)

Configurations: Mass Expulsion with Control Moment Gyros

Equipment Type: Electronic Processor Assembly

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	26.5
Maximum Power (watts):	30.0
Minimum Power (watts):	15.0
Nominal Voltage (volts): —	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 4.67 (10.3 lb)

Volume (cc):  $2.92 \times 10^4$  (1.03 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	40
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	13
Low Rate Telemetry	
Analog Points (No.):	46
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	14

### Safety

Failure Model (flag):	1
Failure Parameters	6000
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	810.0
Test and Evaluation (\$1000):	520.0
Unit Production (\$1000):	140.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.0
Development Lead Time Variable (months):	4.7
Qualification Lead Time Constant (months):	5.5
Qualification Lead Time Variable (months):	0.6
State-of-Art Factor (N.D.):	2.0

Subsystem: S&C (2001)

Configurations: Mass Expulsion with Control Moment Gyros

Equipment Type: Single Gimbaled Control Moment Gyro

#### Performance

##### Technical Characteristics

- |      |                      |                               |
|------|----------------------|-------------------------------|
| (1)  | CMG momentum:        | 69.1 m-kg-sec (500 ft-lb-sec) |
| (2)  | Peak gimbal rate:    | 1 rad/sec                     |
| (3)  | Peak torquer torque: | 85.4 N-m (63 ft-lb)           |
| (4)  |                      |                               |
| (5)  |                      |                               |
| (6)  |                      |                               |
| (7)  |                      |                               |
| (8)  |                      |                               |
| (9)  |                      |                               |
| (10) |                      |                               |

##### Power

Average Power (watts):	30.8
Maximum Power (watts):	100.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 77.1 (170.0 lb)

Volume (cc):  $1.7 \times 10^5$  (6.0 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	12
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	.870
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	12

### Cost

Design Engineering (\$1000):	2000.0
Test and Evaluation (\$1000):	1500.0
Unit Production (\$1000):	1000.0
Reference Quantity (No.):	4
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	10.0
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	4.8
State-of-Art Factor (N.D.):	2.0

Subsystem: S&C (2101)

Configurations: Mass Expulsion with Control Moment Gyros

Equipment Type: Star Sensor Assembly (with electronics)

## Performance

### Technical Characteristics

(1) Type	1
(2) Sensor accuracy ( $3\sigma$ ):	1.7 mrad (0.1 deg)
(3) Mapper field of view:	30.5 mrad <sup>2</sup> (100 deg <sup>2</sup> )
(4) Mapper sensitivity (visual magnitude):	2
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

### Power

Average Power (watts):	5.5
Maximum Power (watts):	7.0
Minimum Power (watts):	3.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 3.2 (7.0 lb)

Volume (cc):  $1.5 \times 10^4$  (0.53 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	3000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	420.0
Test and Evaluation (\$1000):	625.0
Unit Production (\$1000):	115.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	10.0
Development Lead Time Variable (months):	8.0
Qualification Lead Time Constant (months):	7.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.5



Subsystem: S&C (2102)

Configurations: Mass Expulsion with Control Moment Gyros

Equipment Type: Star Sensor Assembly (with electronics)

# Performance

## Technical Characteristics

- |  |  |
|--|--|
| (1) Type:                                  | 2  |
| (2) Sensor accuracy ( $3\sigma$ ):         | 0.87 mrad (0.05 deg)                         |
| (3) Mapper field of view:                  | 122 rad <sup>2</sup> (400 deg <sup>2</sup> ) |
| (4) Mapper sensitivity (visual magnitude): | 4  |
| (5)  |  |
| (6)  |  |
| (7)  |  |
| (8)  |  |
| (9)  |  |
| (10)                                       |  |

## Power

Average Power (watts):	5.0
Maximum Power (watts):	10.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 7.03 (15.5 lb)

Volume (cc):  $4.39 \times 10^4$  (1.55 ft<sup>3</sup>)

## Vibration

Random (g, rms):

Non-Random (g):

## Temperature

Maximum (<sup>o</sup>K): 322 (120<sup>o</sup> F)

Minimum (<sup>o</sup>K): 266 ( 20<sup>o</sup> F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	3000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

## Cost

Design Engineering (\$1000):	600.0
Test and Evaluation (\$1000):	800.0
Unit Production (\$1000):	175.0
Reference Quantity (No.):	1
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	10.0
Development Lead Time Variable (months):	8.0
Qualification Lead Time Constant (months):	7.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.5

Subsystem: S&C (2103)

Configurations: Mass Expulsion with Control Moment Gyros

Equipment Type: Star Sensor Assembly (with electronics)

# Performance

## Technical Characteristics

- |  |  |
|--|--|
| (1) Type:                                  | 3  |
| (2) Sensor accuracy ( $3\sigma$ ):         | 0.05 mrad (0.003 deg)                        |
| (3) Mapper field of view:                  | 8.54 rad <sup>2</sup> (28 deg <sup>2</sup> ) |
| (4) Mapper sensitivity (visual magnitude): | 6  |
| (5)  |  |
| (6)  |  |
| (7)  |  |
| (8)  |  |
| (9)  |  |
| (10)                                       |  |

## Power

Average Power (watts):	8.0
Maximum Power (watts):	12.0
Minimum Power (watts):	4.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 10.4 (23.0 lb)

Volume (cc):  $1.4 \times 10^4$  (0.49 ft<sup>3</sup>)

## Vibration

Random (g, rms):

Non-Random (g):

## Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	18
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	10,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	750.0
Test and Evaluation (\$1000):	1000.0
Unit Production (\$1000):	225.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	10.0
Development Lead Time Variable (months):	8.0
Qualification Lead Time Constant (months):	7.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.5

Subsystem: S&C (2201)

Configurations: Mass Expulsion with Momentum Wheel

Equipment Type: Electronic Error Processor

## Performance

### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts):	4.0
Maximum Power (watts):	6.0
Minimum Power (watts):	2.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	4.5 (10.0 lb)
Volume (cc):	$2.8 \times 10^4$ (1.0 ft <sup>3</sup> )

### Vibration

Random (g, rms):	
Non-Random (g):	

### Temperature

Maximum (°K):	322 (120° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	.
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	9
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	23
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{+9}$ hr):	23,000
Standard Deviation ( $\times 10^{+9}$ hr):	0.5
Dormancy Factor (N.D.):	4
Total Redundant Elements (No.):	

### Cost

Design Engineering (\$1000):	800.0
Test and Evaluation (\$1000):	530.0
Unit Production (\$1000):	138.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.0
Development Lead Time Variable (months):	9.0
Qualification Lead Time Constant (months):	5.5
Qualification Lead Time Variable (months):	1.2
State-of-Art Factor (N.D.):	1.5



Subsystem: APS (0101)

Configurations: Cold Gas

Equipment Type: Thruster (Fairchild 683000)

## Performance

### Technical Characteristics

- |                               |   |
|-------------------------------|---|
| (1) Thrust level:             | 0.22 N (0.05 lb)                          |
| (2) Pulse life:               | 150,000 cycles                            |
| (3) Inlet pressure:           | $2.9 \times 10^5 \text{ N/m}^2$ (42 psia) |
| (4) Total impulse (lb-sec)*:  |   |
| (5) ISP (sec)*:               |   |
| (6) Mixture ratio (N. D.):**: |   |
| (7)                           |   |
| (8)                           |   |
| (9)                           |   |
| (10)                          |   |

### Power

- |   |      |
|---|------|
| Average Power (watts):                    | 1.0  |
| Maximum Power (watts):                    | 25.0 |
| Minimum Power (watts):                    | 0    |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

Weight (kg): 0.34 (0.75 lb)

Volume (cc):  $2.1 \times 10^3$  (0.075 ft<sup>3</sup>)

### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 22.3 |
| Non-Random (g):  |      |

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 339 (150° F) |
| Minimum (°K): | 211 (-80° F) |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 300

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 16

### Cost

Design Engineering (\$1000): 121.0

Test and Evaluation (\$1000): 30.0

Unit Production (\$1000): 9.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0102)

Configurations: Cold Gas

Equipment Type: Thruster (Hydraulic Research 48001770)

## Performance

### Technical Characteristics

- |                               |   |
|-------------------------------|---|
| (1) Thrust level:             | 0.22 N (0.05 lb)                            |
| (2) Pulse life:               | 250,000 cycles                              |
| (3) Inlet pressure:           | $6.89 \times 10^5 \text{ N/m}^2$ (100 psia) |
| (4) Total impulse (lb-sec)*:  |   |
| (5) ISP (sec)*:               |   |
| (6) Mixture ratio (N. D. )**: |   |
| (7)                           |   |
| (8)                           |   |
| (9)                           |   |
| (10)                          |   |

### Power

Average Power (watts):	1.0
Maximum Power (watts):	25.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	
Weight (kg):	0.14 (0.3 lb)
Volume (cc):	850 (0.03 ft <sup>3</sup> )

### Vibration

- |                  |  |
|------------------|--|
| Random (g, rms): |  |
| Non-Random (g):  |  |

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 339 (150° F) |
| Minimum (°K): | 233 (-40° F) |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 300

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 16

### Cost

Design Engineering (\$1000): 61.0

Test and Evaluation (\$1000): 15.0

Unit Production (\$1000): 4.2

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 0.7

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0103)  
Configurations: Cold Gas  
Equipment Type: Thruster (Sterer 51350)  
Performance

Technical Characteristics

- |                              |   |
|------------------------------|---|
| (1) Thrust level:            | 0.22 N (0.05 lb)                          |
| (2) Pulse life:              | 500,000 cycles                            |
| (3) Inlet pressure:          | $2.9 \times 10^5 \text{ N/m}^2$ (42 psia) |
| (4) Total impulse (lb-sec)*: |   |
| (5) ISP (sec)*:              |   |
| (6) Mixture ratio (N.D.)**:  |   |
| (7)                          |   |
| (8)                          |   |
| (9)                          |   |
| (10)                         |   |

Power

- |  |      |
|--|------|
| Average Power (watts):                 | 1.0  |
| Maximum Power (watts):                 | 11.0 |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

- |              |   |
|--------------|---|
| Weight (kg): | 0.2 (0.4 lb)                              |
| Volume (cc): | $1.1 \times 10^3$ (0.04 ft <sup>3</sup> ) |

Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 7.28 |
| Non-Random (g):  |      |

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 344 (160° F) |
| Minimum (°K): | 233 (-40° F) |

- Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 300

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N. D.): 1.0

Total Redundant Elements (No.): 16

### Cost

Design Engineering (\$1000): 75.0

Test and Evaluation (\$1000): 19.0

Unit Production (\$1000): 5.5

Reference Quantity (No.): 3

Factor (N. D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 0.7

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N. D.): 1.0

Subsystem: APS (0104)  
Configurations: Cold Gas  
Equipment Type: Thruster (Sterer 51340)  
Performance

Technical Characteristics

- |      |                           |   |
|------|---------------------------|---|
| (1)  | Thrust level:             | 13 N (3.0 lb)                               |
| (2)  | Pulse life:               | 10,000 cycles                               |
| (3)  | Inlet pressure:           | $1.38 \times 10^6 \text{ N/m}^2$ (200 psia) |
| (4)  | Total impulse (lb-sec)*:  |   |
| (5)  | ISP (sec)*:               |   |
| (6)  | Mixture ratio (N. D.):**: |   |
| (7)  |                           |   |
| (8)  |                           |   |
| (9)  |                           |   |
| (10) |                           |   |

Power

- |   |      |
|---|------|
| Average Power (watts):                    | 1.0  |
| Maximum Power (watts):                    | 40.0 |
| Minimum Power (watts):                    | 0    |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

- |              |   |
|--------------|---|
| Weight (kg): | 0.3 (0.7 lb)                              |
| Volume (cc): | $2.0 \times 10^3$ (0.07 ft <sup>3</sup> ) |

Vibration

- |                  |     |
|------------------|-----|
| Random (g, rms): | 7.5 |
| Non-Random (g):  |     |

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 353 (176° F) |
| Minimum (°K): | 255 ( 0° F)  |

- Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{+9}$  hr): 300

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1

Total Redundant Elements (No.): 16

### Cost

Design Engineering (\$1000): 115.0

Test and Evaluation (\$1000): 115.0

Unit Production (\$1000): 8.7

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0105)

Configurations: Cold Gas

Equipment Type: Thruster (Valcor 27200-511)

## Performance

### Technical Characteristics

- |                               |   |
|-------------------------------|---|
| (1) Thrust level:             | 13 N (3.0 lb)                             |
| (2) Pulse life:               | 5,000 cycles                              |
| (3) Inlet pressure:           | $3.1 \times 10^5 \text{ N/m}^2$ (45 psia) |
| (4) Total impulse (lb-sec)*:  |   |
| (5) ISP (sec)*:               |   |
| (6) Mixture ratio (N. D.):**: |   |
| (7)                           |   |
| (8)                           |   |
| (9)                           |   |
| (10)                          |   |

### Power

Average Power (watts):	1.0
Maximum Power (watts):	32.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	0.45 (1.0 lb)
Volume (cc):	$2.8 \times 10^3$ (0.1 ft <sup>3</sup> )

### Vibration

Random (g, rms):	18.5
Non-Random (g):	

### Temperature

Maximum (°K):	344 (160° F)
Minimum (°K):	239 (-30° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

300

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

16

### Cost

Design Engineering (\$1000):

150.0

Test and Evaluation (\$1000):

150.0

Unit Production (\$1000):

11.5

Reference Quantity (No.):

3

Factor (N.D.):

1

### Schedule

Development Lead Time Constant (months):

2.5

Development Lead Time Variable (months):

1.1

Qualification Lead Time Constant (months):

1.0

Qualification Lead Time Variable (months):

0.1

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (0106)

Configurations: Cold Gas

Equipment Type: Thruster (Sterer 51330)

### Performance

#### Technical Characteristics

- (1) Thrust level: 66.7 N (15.0 lb)
- (2) Pulse life: 10,000 cycles
- (3) Inlet pressure:  $1.38 \times 10^6 \text{ N/m}^2$  (200 psia)
- (4) Total impulse (lb-sec)\*:
- (5) ISP (sec)\*:
- (6) Mixture ratio (N.D.):\*\*:
- (7)
- (8)
- (9)
- (10)

#### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 32.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter  
Requirement (flag):

Weight (kg): 0.64 (1.4 lb)

Volume (cc):  $4.0 \times 10^3$  (0.14 ft<sup>3</sup>)

#### Vibration

- Random (g, rms): 6.1
- Non-Random (g):

#### Temperature

- Maximum (°K): 366 (200° F)
- Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000):

Test and Evaluation (\$1000):

Unit Production (\$1000):

Reference Quantity (No.):

Factor (N.D.):

### Schedule

Development Lead Time Constant (months):

Development Lead Time Variable (months):

Qualification Lead Time Constant (months):

Qualification Lead Time Variable (months):

State-of-Art Factor (N.D.):

Subsystem: . APS (0107)

Configurations: Cold Gas

Equipment Type: Thruster (Kidde 872458)

## Performance

### Technical Characteristics

- (1) Thrust level: 133 N (30.0 lb)
- (2) Pulse life: 20,000 cycles
- (3) Inlet pressure:  $2.24 \times 10^7 \text{ N/m}^2$  (3250 psia)
- (4) Total impulse (lb-sec)\*:
- (5) ISP (sec)\*:
- (6) Mixture ratio (N. D.):\*\*:
- (7)
- (8)
- (9)
- (10)

### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 34.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

- Weight (kg): 1.3 (2.8 lb)
- Volume (cc):  $8.5 \times 10^3$  (0.3 ft<sup>3</sup>)

### Vibration

- Random (g, rms):
- Non-Random (g):

### Temperature

- Maximum (°K): 344 (160° F)
- Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

    Analog Points (No.):

    Digital Points (No.):

    Sample Rate ( $\text{sec}^{-1}$ ):

    Word Length (bits):

Low Rate Telemetry

    Analog Points (No.):

    Digital Points (No.):

    Sample Rate ( $\text{sec}^{-1}$ ):

    Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

    Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 300

    Standard Deviation ( $\times 10^{+9}$  hr): 1.0

    Dormancy Factor (N.D.): 16

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000): 324.0

Test and Evaluation (\$1000): 324.0

Unit Production (\$1000): 26.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0108)

Configurations: Cold Gas

Equipment Type: Thruster (Sterer 31980)

### Performance

#### Technical Characteristics

- (1) Thrust level: 133 N (30.0 lb)
- (2) Pulse life: 100,000 cycles
- (3) Inlet pressure:  $1.38 \times 10^7$  N/m<sup>2</sup> (2000 psia)
- (4) Total impulse (lb-sec)\*:
- (5) ISP (sec)\*:
- (6) Mixture ratio (N. D.)\*\*:
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts): 1.0  
Maximum Power (watts): 37.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.95 (2.1 lb)

Volume (cc):  $5.9 \times 10^3$  (0.21 ft<sup>3</sup>)

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum (°K): 344 (160° F)

Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

300

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

16

### Cost

Design Engineering (\$1000):

261.0

Test and Evaluation (\$1000):

261.0

Unit Production (\$1000):

20.8

Reference Quantity (No.):

3

Factor (N.D.):

1

### Schedule

Development Lead Time Constant (months):

2.5

Development Lead Time Variable (months):

1.6

Qualification Lead Time Constant (months):

1.0

Qualification Lead Time Variable (months):

0.2

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (0109)

Configurations: Cold Gas

Equipment Type: Thruster (Valcor 27200)

#### Performance

##### Technical Characteristics

- |                              |   |
|------------------------------|---|
| (1) Thrust level:            | 133 N (30.0 lb)                               |
| (2) Pulse life:              | 5000 cycles                                   |
| (3) Inlet pressure:          | $2.068 \times 10^7 \text{ N/m}^2$ (3000 psia) |
| (4) Total impulse (lb-sec)*: |   |
| (5) ISP (sec)*:              |   |
| (6) Mixture ratio (N.D.)**:  |   |
| (7)                          |   |
| (8)                          |   |
| (9)                          |   |
| (10)                         |   |

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	45.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg):	0.23 (0.51 lb)
Volume (cc):	$5.7 \times 10^3$ (0.2 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	18.5
Non-Random (g):	

##### Temperature

Maximum (°K):	344 (160° F)
Minimum (°K):	219 (-65° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 300

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 16

### Cost

Design Engineering (\$1000): 91.0

Test and Evaluation (\$1000): 91.0

Unit Production (\$1000): 6.8

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.5

Development Lead Time Variable (months): 1.6

Qualification Lead Time Constant (months): 1.0

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0201)

Configurations: Cold Gas

Equipment Type: Isolation Valve (latching solenoid) (Valcor 272000-454)

Performance

#### Technical Characteristics

- (1) Maximum pressure:  $2.413 \times 10^7 \text{ N/m}^2$  (3500 psia)
- (2) Flow area:  $1.6 \times 10^{-2} \text{ cm}^2$  (0.0025 in<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts): 0

Maximum Power (watts): 30.0

Minimum Power (watts): 0

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.23 (0.50 lb)

Volume (cc):  $1.4 \times 10^3$  (0.05 ft<sup>3</sup>)

#### Vibration

Random (g, rms): 18.5

Non-Random (g):

#### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

1

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

70

Standard Deviation ( $\times 10^{\pm 9}$  hr):

..

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

1

### Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

CER

### Schedule

Development Lead Time Constant (months):

0

Development Lead Time Variable (months):

0

Qualification Lead Time Constant (months):

0

Qualification Lead Time Variable (months):

0

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (0202)

Configurations: Cold Gas

Equipment Type: Isolation Valve (latching solenoid) (Sterer 51570)

#### Performance

##### Technical Characteristics.

- (1) Maximum pressure:  $3.172 \times 10^7 \text{ N/m}^2$  (4600 psia)
- (2) Flow area:  $0.12 \text{ cm}^2$  ( $0.018 \text{ in}^2$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 0
- Maximum Power (watts): 51.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter Requirement (flag):

Weight (kg): 1.1 (2.5 lb)

Volume (cc):  $7.1 \times 10^3$  ( $0.25 \text{ ft}^3$ )

##### Vibration

- Random (g, rms): 7.3
- Non-Random (g):

##### Temperature

- Maximum ( $^{\circ}\text{K}$ ): 339 ( $150^{\circ}\text{F}$ )
- Minimum ( $^{\circ}\text{K}$ ): 233 ( $-40^{\circ}\text{F}$ )

Pressure ( $\text{kg/m}^2$ ):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

1

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

70

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

1

### Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

CER

### Schedule

Development Lead Time Constant (months)

0

Development Lead Time Variable (months)

0

Qualification Lead Time Constant (months)

0

Qualification Lead Time Variable (months)

0

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (0203)

Configurations: Cold Gas

Equipment Type: Isolation Valve (pyrotechnic) (Pyrotechnics 1436-7)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $2.413 \times 10^7 \text{ N/m}^2$  (3500 psia)
- (2) Flow area:  $0.14 \text{ cm}^2$  ( $0.022 \text{ in}^2$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 0  
Maximum Power (watts): 12.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.16 (0.35 lb)

Volume (cc):  $1.1 \times 10^3$  (0.04 ft

### Vibration

Random (g, rms): 16.9

Non-Random (g):

### Temperature

Maximum ( $^{\circ}\text{K}$ ): 344 ( $160^{\circ}\text{ F}$ )

Minimum ( $^{\circ}\text{K}$ ): 219 ( $-65^{\circ}\text{ F}$ )

Pressure ( $\text{kg/m}^2$ ):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	100
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	1

### Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (0204)

Configurations: Cold Gas

Equipment Type: Isolation Valve (latching solenoid) (Valcor V27700)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $2.069 \times 10^7 \text{ N/m}^2$  (3000 psia)
- (2) Flow area:  $23.6 \text{ cm}^2$  ( $3.66 \text{ in}^2$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

- Average Power (watts): 0
- Maximum Power (watts): 110.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter Requirement (flag):

Weight (kg): 2.7 (6.0 lb)

Volume (cc):  $1.7 \times 10^4$  ( $0.6 \text{ ft}^3$ )

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum ( $^{\circ}\text{K}$ ): 344 ( $160^{\circ}\text{F}$ )

Minimum ( $^{\circ}\text{K}$ ): 219 ( $-65^{\circ}\text{F}$ )

Pressure ( $\text{kg/m}^2$ ):



# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 70

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

## Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (0301)

Configurations: Cold Gas

Equipment Type: Filter (APM AC-A370-6)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $2.758 \times 10^7 \text{ N/m}^2$  (4000 psia)
- (2) Flow resistance:  $1.0 \times 10^{11} \text{ N/(kg-m)}^2$  ( $3.0 \times 10^6 \text{ psi}$   
 $\text{sec}^2/\text{lb}^2$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.41 (0.91 lb)  
Volume (cc):  $2.8 \times 10^3$  (0.1 ft<sup>3</sup>)

### Vibration

Random (g, rms): 18.5  
Non-Random (g):

### Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

Performance (continued)

CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 10

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (0302)

Configurations: Cold Gas

Equipment Type: Filter (Vacco FID10178)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $2.758 \times 10^7 \text{ N/m}^2$  (4000 psia)
- (2) Flow resistance:  $3.4 \times 10^8 \text{ N/(kg-m)}^2$  ( $1.0 \times 10^4 \frac{\text{psi}}{\text{sec}^2/\text{lb}^2}$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA

Maximum Power (watts): NA

Minimum Power (watts): NA

Nominal Voltage (volts): NA

Maximum Voltage (volts): NA

Minimum Voltage (volts): NA

Converter/Inverter Requirement (flag):

Weight (kg): 0.43 (0.95 lb)

Volume (cc):  $2.8 \times 10^3$  ( $0.1 \text{ ft}^3$ )

##### Vibration

Random (g, rms): 21.0

Non-Random (g):

##### Temperature

Maximum ( $^{\circ}\text{K}$ ): 366 ( $200^{\circ}\text{F}$ )

Minimum ( $^{\circ}\text{K}$ ): 219 ( $-65^{\circ}\text{F}$ )

Pressure ( $\text{kg/m}^2$ ):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 10

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0401)

Configurations: Cold Gas

Equipment Type: Pressure Regulator (Sterer 51320)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $3.448 \times 10^7 \text{ N/m}^2$  (5000 psi)
- (2) Flow area:  $0.0090 \text{ cm}^2$  ( $0.0014 \text{ in}^2$ )
- (3) Minimum set point:  $1.0 \times 10^5 \text{ N/m}^2$  (15 psia)
- (4) Maximum set point:  $6.90 \times 10^5 \text{ N/m}^2$  (100 psia)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.522 (1.15 lb)  
Volume (cc):  $2.8 \times 10^3$  ( $0.1 \text{ ft}^3$ )

### Vibration

Random (g, rms): 7.3  
Non-Random (g):

### Temperature

Maximum ( $^{\circ}\text{K}$ ): 344 ( $160^{\circ}\text{F}$ )  
Minimum ( $^{\circ}\text{K}$ ): 233 ( $-40^{\circ}\text{F}$ )

Pressure ( $\text{kg/m}^2$ ):

02

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 178.0

Test and Evaluation (\$1000): 48.0

Unit Production (\$1000): 22.5

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.8

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.3

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0402)

Configurations: Cold Gas

Equipment Type: Pressure Regulator (Fairchild 617000)

### Performance

#### Technical Characteristics

- (1) Maximum pressure:  $2.690 \times 10^7 \text{ N/m}^2$  (3900 psia)
- (2) Flow area:  $0.006 \text{ cm}^2$  (0.001 in<sup>2</sup>)
- (3) Minimum set point:  $2.4 \times 10^5 \text{ N/m}^2$  (35 psia)
- (4) Maximum set point:  $2.8 \times 10^5 \text{ N/m}^2$  (41 psia)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.54 (1.2 lb)

Volume (cc):  $2.8 \times 10^3$  (0.1 ft<sup>3</sup>)

#### Vibration

Random (g, rms): 12.7  
Non-Random (g):

#### Temperature

Maximum (°K): 339 (150° F)  
Minimum (°K): 239 (-30° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 5000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 181.0

Test and Evaluation (\$1000): 50.0

Unit Production (\$1000): 23.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.8

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.3

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0403)

Configurations: Cold Gas

Equipment Type: Pressure Regulator (Sterer 51310)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $3.172 \times 10^7 \text{ N/m}^2$  (4600 psia)
- (2) Flow area:  $0.13 \text{ cm}^2$  (0.02 in<sup>2</sup>)
- (3) Minimum set point:  $1.38 \times 10^6 \text{ N/m}^2$  (200 psia)
- (4) Maximum set point:  $1.72 \times 10^6 \text{ N/m}^2$  (250 psia)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.9 (4.1 lb)  
Volume (cc):  $1.1 \times 10^4$  (0.4 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 7.3  
Non-Random (g):

##### Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): . . . . .

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 5000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 460.0

Test and Evaluation (\$1000): 125.0

Unit Production (\$1000): 47.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 2.8

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.3

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0501)

Configurations: Cold Gas

Equipment Type: Tank (PSI 80082)

## Performance

### Technical Characteristics

- (1) Volume:  $6.55 \times 10^3 \text{ cm}^3$  (400 in<sup>3</sup>)
- (2) Maximum pressure:  $2.496 \times 10^7 \text{ N/m}^2$  (3620 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 2.8 (6.1 lb)

Volume (cc):  $6.5 \times 10^3$  (0.23 ft<sup>3</sup>)

### Vibration

Random (g, rms)

Non-Random (g):

### Temperature

Maximum (°K): 344 (160° F)

Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

## High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

## Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

## Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0502)

Configurations: Cold Gas

Equipment Type: Tank (Fansteel 9490304)

#### Performance

##### Technical Characteristics

- (1) Volume:  $1.57 \times 10^4 \text{ cm}^3$  (960 in<sup>3</sup>)
- (2) Maximum pressure:  $2.240 \times 10^7 \text{ N/m}^2$  (3250 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 5.4 (12.0 lb)  
Volume (cc):  $1.6 \times 10^4$  (0.56 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.)

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0503)  
Configurations: Cold Gas  
Equipment Type: Tank (Fansteel)

#### Performance

##### Technical Characteristics

- (1) Volume:  $2.130 \times 10^4 \text{ cm}^3$  (1300 in<sup>3</sup>)
- (2) Maximum pressure:  $3.568 \times 10^7 \text{ N/m}^2$  (5175 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 12.6 (27.8 lb)  
Volume (cc):  $2.1 \times 10^4$  (0.75 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	60
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (0504)  
Configurations: Cold Gas  
Equipment Type: Tank (Arde E3749)

Performance

Technical Characteristics

- (1) Volume:  $3.212 \times 10^4 \text{ cm}^3$  (1960 in<sup>3</sup>)
- (2) Maximum pressure:  $2.240 \times 10^7 \text{ N/m}^2$  (3250 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 10.0 (22.0 lb)  
Volume (cc):  $3.2 \times 10^4$  (1.13 ft<sup>3</sup>)

Vibration

Random (g, rms): 8.3  
Non-Random (g):

Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9} \text{ hr.}$ ): 360

Standard Deviation ( $\times 10^{\pm 9} \text{ hr.}$ ):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0506)  
Configurations: Cold Gas  
Equipment Type: Tank (Airite 6396)

#### Performance

##### Technical Characteristics

- (1) Volume:  $4.441 \times 10^4 \text{ cm}^3$  (2710 in<sup>3</sup>)
- (2) Maximum pressure:  $2.240 \times 10^7 \text{ N/m}^2$  (3250 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 13.6 (30.0 lb)  
Volume (cc):  $4.4 \times 10^4$  (1.57 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 344 (160°F)  
Minimum (°K): 219 (-65°F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

· Analog Points (No.):

· Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

· Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0507) .  
Configurations: Cold Gas  
Equipment Type: Tank (Airite 6485-3)

#### Performance

##### Technical Characteristics

- (1) Volume:  $5.709 \times 10^4 \text{ cm}^3$  (3484 in<sup>3</sup>)
- (2) Maximum pressure:  $3.310 \times 10^7 \text{ N/m}^2$  (4800 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 22.7 (50.0 lb)  
Volume (cc):  $2.72 \times 10^4$  (2.02 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 366 (200° F)  
Minimum (°K): 200 (-100° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	360
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (0508)  
Configurations: Cold Gas  
Equipment Type: Tank (Airite 6529-1)

#### Performance

##### Technical Characteristics

- (1) Volume:  $9.504 \times 10^4 \text{ cm}^3$  (5800 in<sup>3</sup>)
- (2) Maximum pressure:  $2.413 \times 10^7 \text{ N/m}^2$  (3500 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 25.1 (55.5 lb)  
Volume (cc):  $9.51 \times 10^4$  (3.36 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 13.1  
Non-Random (g):

##### Temperature

Maximum (°K): 394 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0509)  
Configurations: Cold Gas  
Equipment Type: Tank (Fansteel 4425003)

Performance

Technical Characteristics

- (1) Volume:  $1.274 \times 10^5 \text{ cm}^3$  (7775 in<sup>3</sup>)
- (2) Maximum pressure:  $2.206 \times 10^7 \text{ N/m}^2$  (3200 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 49.9 (110.0 lb)  
Volume (cc):  $1.27 \times 10^5$  (4.50 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

- Analog Points (No.):

- Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0601)

Configurations: Cold Gas

Equipment Type: Fill and Drain Valve (Sterer 34650-1)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $3.172 \times 10^7 \text{ N/m}^2$  (4600 psia)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.073 (0.16 lb)

Volume (cc): 560 (0.02 ft<sup>3</sup>)

### Vibration

Random (g, rms): 7.3

Non-Random (g):

### Temperature

Maximum (°K): 344 (160° F)

Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{+6}$ ): 70

Standard Deviation ( $\times 10^{+9}$  hr.):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0701)

Configurations: Cold Gas

Equipment Type: Relief Valve (Pyronetics)

#### Performance

##### Technical Characteristics

- (1) Minimum set point:  $1.86 \times 10^6 \text{ N/m}^2$  (270 psia)
- (2) Maximum set point:  $2.07 \times 10^6 \text{ N/m}^2$  (300 psia)
- (3) Maximum operating pressure:  $2.413 \times 10^7 \text{ N/m}^2$  (3500 psia)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA

Maximum Power (watts): NA

Minimum Power (watts): NA

Nominal Voltage (volts): NA

Maximum Voltage (volts): NA

Minimum Voltage (volts): NA

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.09 (0.2 lb)

Volume (cc): 560 (0.02 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 7}$  hr): 70

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0801)

Configurations: Monopropellant

Equipment Type: Thruster (Rocket Research MR-74)

## Performance

### Technical Characteristics

- |      |                         |   |
|------|-------------------------|---|
| (1)  | Thrust level:           | 0.44 N (0.1 lb)                                 |
| (2)  | Pulse life:             | 100,000 cycles                                  |
| (3)  | Inlet pressure:         | $2.07 \times 10^6 \text{ N/m}^2$ (300 psia)     |
| (4)  | Total impulse:*         | $8.0 \times 10^4 \text{ N-sec}$ (18,000 lb-sec) |
| (5)  | ISP:*                   | 220 sec   |
| (6)  | Mixture ratio (N.D.):** |   |
| (7)  |                         |   |
| (8)  |                         |   |
| (9)  |                         |   |
| (10) |                         |   |

### Power

- |  |      |
|--|------|
| Average Power (watts):                 | 1.0  |
| Maximum Power (watts):                 | 2.6  |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

Weight (kg): .0.29 (0.65 lb)

Volume (cc):  $2.0 \times 10^3$  (0.07 ft<sup>3</sup>)

### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 17.0 |
| Non-Random (g):  |      |

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 355 (180° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

- \*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 109.0

Test and Evaluation (\$1000): 27.0

Unit Production (\$1000): 8.2

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0802)

Configurations: Monopropellant

Equipment Type: Thruster (Hamilton Standard REA-10-13) .

#### Performance

##### Technical Characteristics

(1)	Thrust level:	0.44 N (0.1 lb)
(2)	Pulse life:	375,000 cycles
(3)	Inlet pressure:	$1.72 \times 10^6$ N/m <sup>2</sup> (250 psia)
(4)	Total impulse:*	$7.43 \times 10^4$ N-sec (16,700 lb-sec)
(5)	ISP:*	225 sec
(6)	Mixture ratio (N.D.):**	
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	6.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter  
Requirement (flag):

Weight (kg):	0.14 (0.3 lb)
Volume (cc):	850 (0.03 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	21.0
Non-Random (g):	

##### Temperature

Maximum (°K):	333 (140° F)
Minimum (°K):	266 (20° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 61.0

Test and Evaluation (\$1000): 15.0

Unit Production (\$1000): 4.4

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0803)

Configurations: 1 Monopropellant

Equipment Type: Thruster (Rocket Research MR-6C)

## Performance

### Technical Characteristics

- |                              |   |
|------------------------------|---|
| (1) Thrust level:            | 2.2 N (0.5 lb)                                  |
| (2) Pulse life:              | 100,000 cycles                                  |
| (3) Inlet pressure:          | $1.93 \times 10^6 \text{ N/m}^2$ (280 psia)     |
| (4) Total impulse*:          | $6.7 \times 10^4 \text{ N-sec}$ (15,000 lb-sec) |
| (5) ISP*:                    | 224 sec   |
| (6) Mixture ratio (N. D.)**: |   |
| (7)                          |   |
| (8)                          |   |
| (9)                          |   |
| (10)                         |   |

### Power

- |  |      |
|--|------|
| Average Power (watts):                 | 1.0  |
| Maximum Power (watts):                 | 4.0  |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

Weight (kg): 0.29 (0.65 lb)

Volume (cc):  $2.0 \times 10^3$  (0.07 ft<sup>3</sup>)

### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 21.0 |
| Non-Random (g):  |      |

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 328 (130° F) |
| Minimum (°K): | 244 (-20° F) |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{-7}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 109.0

Test and Evaluation (\$1000): 27.0

Unit Production (\$1000): 8.2

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0804)  
Configurations: Monopropellant  
Equipment Type: Thruster (Hamilton Standard REA-17-7)

#### Performance

##### Technical Characteristics

- |                             |  |
|-----------------------------|--|
| (1) Thrust level:           | 2.2 N (0.5 lb)                                 |
| (2) Pulse life:             | $1.5 \times 10^6$ cycles                       |
| (3) Inlet pressure:         | $1.72 \times 10^6$ N/m <sup>2</sup> (250 psia) |
| (4) Total impulse*:         | $8.0 \times 10^4$ N-sec (18,000 lb-sec)        |
| (5) ISP*:                   | 227 sec  |
| (6) Mixture ratio (N.D.)**: |  |
| (7)                         |  |
| (8)                         |  |
| (9)                         |  |
| (10)                        |  |

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	8.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	0.2 (0.4 lb)
Volume (cc):	$1.1 \times 10^3$ (0.04 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	333 (140° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 76.0

Test and Evaluation (\$1000): 76.0

Unit Production (\$1000): 5.6

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0805)  
Configurations: Monopropellant  
Equipment Type: Thruster (Hughes HS-333)  
Performance

Technical Characteristics

- (1) Thrust level: 4.4 N (1.0 lb)
- (2) Pulse life: 20,000 cycles
- (3) Inlet pressure (psia):
- (4) Total impulse (lb-sec)\*:
- (5) ISP (sec)\*:
- (6) Mixture ratio (N. D.)\*\*:
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts):  
Maximum Power (watts):  
Minimum Power (watts):  
Nominal Voltage (volts):  
Maximum Voltage (volts):  
Minimum Voltage (volts):  
Converter/Inverter  
Requirement (flag):

Weight (kg):

Volume (cc):

Vibration

Random (g, rms)  
Non-Random (g):

Temperature

Maximum ( $^{\circ}$ K):  
Minimum ( $^{\circ}$ K):

Pressure ( $\text{kg}/\text{m}^2$ ):

---

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 115.0

Test and Evaluation (\$1000): 115.0

Unit Production (\$1000): 8.7

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0806)

Configurations: Monopropellant

Equipment Type: Thruster (TRW MRE-1)

Performance

#### Technical Characteristics

- |                              |  |
|------------------------------|--|
| (1) Thrust level:            | 4.4 N (1.0 lb)                                 |
| (2) Pulse life:              | 100,000 cycles                                 |
| (3) Inlet pressure:          | $2.59 \times 10^6$ N/m <sup>2</sup> (375 psia) |
| (4) Total impulse*:          | $4.4 \times 10^4$ N-sec (9,800 lb-sec)         |
| (5) ISP*:                    | 220 sec  |
| (6) Mixture ratio (N. D.)**: | -  |
| (7)                          |  |
| (8)                          |  |
| (9)                          |  |
| (10)                         |  |

#### Power

- |  |      |
|--|------|
| Average Power (watts):                 | 1.0  |
| Maximum Power (watts):                 | 5.4  |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 31.0 |
| Minimum Voltage (volts):               | 26.0 |
| Converter/Inverter Requirement (flag): |      |

- |              |   |
|--------------|---|
| Weight (kg): | 0.3 (0.7 lb)                              |
| Volume (cc): | $2.0 \times 10^3$ (0.07 ft <sup>3</sup> ) |

#### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 21.0 |
| Non-Random (g):  |      |

#### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 322 (120° F) |
| Minimum (°K): | 278 (40° F)  |

#### Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

    Analog Points (No.):

    Digital Points (No.):

    Sample Rate ( $\text{sec}^{-1}$ ):

    Word Length (bits):

Low Rate Telemetry

    Analog Points (No.): 2

    Digital Points (No.):

    Sample Rate ( $\text{sec}^{-1}$ ): 1

    Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

    Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

    Standard Deviation ( $\times 10^{\pm 9}$  hr):

    Dormancy Factor (N.D.): 0.1

    Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 115.0

Test and Evaluation (\$1000): 115.0

Unit Production (\$1000): 8.7

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.9

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0807)  
Configurations: Monopropellant  
Equipment Type: Thruster (TRW MRE-3)

#### Performance

##### Technical Characteristics

- |      |                          |   |
|------|--------------------------|---|
| (1)  | Thrust level:            | 16 N (3.7 lb)                               |
| (2)  | Pulse life:              | 60,000 cycles                               |
| (3)  | Inlet pressure:          | $4.14 \times 10^6 \text{ N/m}^2$ (600 psia) |
| (4)  | Total impulse (lb-sec)*: |   |
| (5)  | ISP (sec)*:              |   |
| (6)  | Mixture ratio (N. D.)**: |   |
| (7)  |                          |   |
| (8)  |                          |   |
| (9)  |                          |   |
| (10) |                          |   |

##### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 1.0  |
| Maximum Power (watts):   | 5.4  |
| Minimum Power (watts):   | 0.0  |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 31.0 |
| Minimum Voltage (volts): | 26.0 |

Converter/Inverter  
Requirement (flag):

- |              |   |
|--------------|---|
| Weight (kg): | 0.3 (0.6 lb)                              |
| Volume (cc): | $1.7 \times 10^3$ (0.06 ft <sup>3</sup> ) |

##### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 19.5 |
| Non-Random (g):  |      |

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 322 (120° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 101.0

Test and Evaluation (\$1000): 101.0

Unit Production (\$1000): 7.7

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 0.8

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0808)  
Configurations: Monopropellant  
Equipment Type: Thruster (TRW 404040)  
Performance

Technical Character-----

- |      |                         |  |
|------|-------------------------|--|
| (1)  | Thrust level:           | 18 N (4.1 lb)                                  |
| (2)  | Pulse life:             | 93,000 cycles                                  |
| (3)  | Inlet pressure:         | $4.14 \times 10^6$ N/m <sup>2</sup> (600 psia) |
| (4)  | Total impulse*:         | $6.49 \times 10^4$ N-sec (14,600 lb-sec)       |
| (5)  | ISP*:                   | 230 sec  |
| (6)  | Mixture ratio (N.D.)**: |  |
| (7)  |                         |  |
| (8)  |                         |  |
| (9)  |                         |  |
| (10) |                         |  |

Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 1.0  |
| Maximum Power (watts):   | 5.53 |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.6 |
| Minimum Voltage (volts): | 26.0 |

Converter/Inverter  
Requirement (flag):

- |              |   |
|--------------|---|
| Weight (kg): | 0.3 (0.6 lb)                              |
| Volume (cc): | $1.7 \times 10^3$ (0.06 ft <sup>3</sup> ) |

Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 19.5 |
| Non-Random (g):  |      |

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 322 (120° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 101.0

Test and Evaluation (\$1000): 101.0

Unit Production (\$1000): 7.7

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0809)  
Configurations: Monopropellant  
Equipment Type: Thruster (Hamilton Standard REA-16-10)

#### Performance

##### Technical Characteristics

- |      |                         |  |
|------|-------------------------|--|
| (1)  | Thrust level:           | 22 N (5.0 lb)                                  |
| (2)  | Pulse life:             | 100,000 cycles                                 |
| (3)  | Inlet pressure:         | $2.07 \times 10^6$ N/m <sup>2</sup> (300 psia) |
| (4)  | Total impulse*:         | $1.49 \times 10^5$ N-sec (33,500 lb-sec)       |
| (5)  | ISP*:                   | 235 sec  |
| (6)  | Mixture ratio (N.D.)**: |  |
| (7)  |                         |  |
| (8)  |                         |  |
| (9)  |                         |  |
| (10) |                         |  |

##### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 1.0  |
| Maximum Power (watts):   | 17.8 |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

- |              |   |
|--------------|---|
| Weight (kg): | 0.4 (0.9 lb)                              |
| Volume (cc): | $2.5 \times 10^3$ (0.09 ft <sup>3</sup> ) |

##### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 19.6 |
| Non-Random (g):  |      |

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 333 (140° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 139.0

Test and Evaluation (\$1000): 139.0

Unit Production (\$1000): 10.6

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.2

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.):

Subsystem: APS (0810)  
Configurations: Monopropellant  
Equipment Type: Thruster (Rocket Research MR-50A)

Performance

Technical Characteristics

- |      |                         |  |
|------|-------------------------|--|
| (1)  | Thrust level:           | 22 N (5.0 lb)                                  |
| (2)  | Pulse life:             | 175,000 cycles                                 |
| (3)  | Inlet pressure:         | $1.59 \times 10^6$ N/m <sup>2</sup> (230 psia) |
| (4)  | Total impulse*:         | $2.02 \times 10^5$ N-sec (45,500 lb-sec)       |
| (5)  | ISP*:                   | 227 sec  |
| (6)  | Mixture ratio (N.D.)**: |  |
| (7)  |                         |  |
| (8)  |                         |  |
| (9)  |                         |  |
| (10) |                         |  |

Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 1.0  |
| Maximum Power (watts):   | 21.0 |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

- |              |  |
|--------------|--|
| Weight (kg): | 0.54 (1.2 lb)                            |
| Volume (cc): | $2.8 \times 10^3$ (0.1 ft <sup>3</sup> ) |

Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 38.0 |
| Non-Random (g):  |      |

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 333 (140° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (N.D.): 12

### Cost

Design Engineering (\$1000): 171.0

Test and Evaluation (\$1000): 171.0

Unit Production (\$1000): 13.2

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0811)  
Configurations: Monopropellant  
Equipment Type: Thruster (Rocket Research MR-3A)

#### Performance

##### Technical Characteristics

- |      |                          |  |
|------|--------------------------|--|
| (1)  | Thrust level:            | 110 N (25.0 lb)                                |
| (2)  | Pulse life:              | 25,000 cycles                                  |
| (3)  | Inlet pressure:          | $2.48 \times 10^6$ N/m <sup>2</sup> (360 psia) |
| (4)  | Total impulse*:          | $6.27 \times 10^5$ N-sec (141,000 lb-sec)      |
| (5)  | ISP*:                    | 228 sec  |
| (6)  | Mixture ratio (N. D.)**: |  |
| (7)  |                          |  |
| (8)  |                          |  |
| (9)  |                          |  |
| (10) |                          |  |

##### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 1.0  |
| Maximum Power (watts):   | 26.0 |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

- |              |   |
|--------------|---|
| Weight (kg): | 2.10 (4.64 lb)                            |
| Volume (cc): | $1.3 \times 10^4$ (0.46 ft <sup>3</sup> ) |

##### Vibration

- |                  |      |
|------------------|------|
| Random (g, rms): | 36.0 |
| Non-Random (g):  |      |

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 394 (250° F) |
| Minimum (°K): | 278 (40° F)  |

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 480.0

Test and Evaluation (\$1000): 480.0

Unit Production (\$1000): 39.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0812)  
Configurations: Monopropellant  
Equipment Type: Thruster (Marquardt R-24-C)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 110 N (25.0 lb)
- (2) Pulse life: 200,000 cycles
- (3) Inlet pressure:  $2.28 \times 10^6$  N/m<sup>2</sup> (330 psia)
- (4) Total impulse\*:  $2.22 \times 10^5$  N-sec (50,000 lb-sec)
- (5) ISP\*: 231 sec
- (6) Mixture ratio (N. D.)\*\*:
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 56.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter Requirement (flag):

- Weight (kg): 1.1 (2.5 lb)
- Volume (cc):  $7.1 \times 10^3$  (0.25 ft<sup>3</sup>)

##### Vibration

- Random (g, rms):
- Non-Random (g):

##### Temperature

- Maximum (°K): 322 (120° F)
- Minimum (°K): 278 (40° F)

- Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 6

## Cost

Design Engineering (\$1000): 300.0

Test and Evaluation (\$1000): 300.0

Unit Production (\$1000): 23.8

Reference Quantity (No.): 3

Factor (N.D.): 1

## Schedule

Development L Constant (months): 3.0

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.):

Subsystem: APS (0813)  
Configurations: Monopropellant  
Equipment Type: Thruster (Rocket Research MR-3C)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 180 N (40.0 lb)
- (2) Pulse life: 25,000 cycles
- (3) Inlet pressure:  $3.55 \times 10^6$  N/m<sup>2</sup> (515 psia)
- (4) Total impulse\*:  $6.27 \times 10^5$  N-sec (141,000 lb-sec)
- (5) ISP\*: 228 sec
- (6) Mixture ratio (N.D.)\*\*:
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 1.0  
Maximum Power (watts): 28.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

- Weight (kg): 1.26 (2.78 lb)  
Volume (cc):  $7.9 \times 10^3$  (0.28 ft<sup>3</sup>)

##### Vibration

- Random (g, rms): 36.0  
Non-Random (g):

##### Temperature

- Maximum (°K): 394 (250° F)  
Minimum (°K): 278 ( 40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 322.0

Test and Evaluation (\$1000): 322.0

Unit Production (\$1000): 25.8

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.7

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0814)  
Configurations: Monopropellant  
Equipment Type: Thruster (TRW MRE-50-73)

#### Performance

##### Technical Characteristics

- |      |                          |  |
|------|--------------------------|--|
| (1)  | Thrust level:            | 222 N (50.0 lb)                        |
| (2)  | Pulse life:              | 1500 cycles                            |
| (3)  | Inlet pressure (psia):   |  |
| (4)  | Total impulse*:          | $2.22 \times 10^4$ N-sec (5000 lb-sec) |
| (5)  | ISP*:                    | 230 sec                                |
| (6)  | Mixture ratio (N. D.)**: |  |
| (7)  |                          |  |
| (8)  |                          |  |
| (9)  |                          |  |
| (10) |                          |  |

##### Power

- |  |      |
|--|------|
| Average Power (watts):                 | 1.0  |
| Maximum Power (watts):                 | 20.0 |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

- |              |  |
|--------------|--|
| Weight (kg): | 2.3 (5.0 lb)                             |
| Volume (cc): | $1.4 \times 10^4$ (0.5 ft <sup>3</sup> ) |

##### Vibration

- Random (g, rms):  
Non-Random (g):

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 333 (140° F) |
| Minimum (°K): | 278 ( 40° F) |

##### Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 02.0

Test and Evaluation (\$1000): 02.0

Unit Production (\$1000): 41.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 1.9

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0815)  
Configurations: Monopropellant  
Equipment Type: Thruster (Marquardt R-30)

#### Performance

##### Technical Characteristics

- |      |                          |  |
|------|--------------------------|--|
| (1)  | Thrust level:            | 689 N (155.0 lb)                               |
| (2)  | Pulse life:              | 500 cycles                                     |
| (3)  | Inlet pressure:          | $3.10 \times 10^6$ N/m <sup>2</sup> (450 psia) |
| (4)  | Total impulse*:          | $2.22 \times 10^5$ N-sec (50,000 lb-sec)       |
| (5)  | ISP*:                    | 234 sec  |
| (6)  | Mixture ratio (N. D.)**: |  |
| (7)  |                          |  |
| (8)  |                          |  |
| (9)  |                          |  |
| (10) |                          |  |

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	29.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	1.3 (2.9 lb)
Volume (cc):	$8.2 \times 10^3$ (0.29 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	15.0
Non-Random (g):	

##### Temperature

Maximum (°K):	322 (120° F)
Minimum (°K):	278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 334.0

Test and Evaluation (\$1000): 334.0

Unit Production (\$1000): 26.8

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 3.0

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 0.6

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0816)

Configurations: Monopropellant

Equipment Type: Thruster (Walter Kidde 142692)

# Performance

## Technical Characteristics

- (1) Thrust level: 1330 N (300.0 lb)
- (2) Pulse life (cycles):
- (3) Inlet pressure (psia):
- (4) Total impulse\*:  $2.22 \times 10^5$  N-sec (500,000 lb-sec)
- (5) ISP (sec)\*:
- (6) Mixture ratio (N.D.)\*\*:
- (7)
- (8)
- (9)
- (10)

## Power

Average Power (watts): 1.0

Maximum Power (watts): 20.0

Minimum Power (watts): 0

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter Requirement (flag):

Weight (kg): 2.3 (5.0 lb)

Volume (cc):  $1.4 \times 10^4$  (0.5 ft<sup>3</sup>)

## Vibration

Random (g, rms):

Non-Random (g):

## Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters

\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000):

Test and Evaluation (\$1000):

Unit Production (\$1000):

Reference Quantity (No.):

Factor (N.D.):

### Schedule

Development Lead Time Constant (months):

Development Lead Time Variable (months):

Qualification Lead Time Constant (months):

Qualification Lead Time Variable (months):

State-of-Art Factor (N.D.):

Subsystem: APS (0817)  
Configurations: Monopropellant  
Equipment Type: Thruster (Rocket Motor MR-80A)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 2810 N (632.0 lb)
- (2) Pulse life: 500 cycles
- (3) Inlet pressure:  $3.31 \times 10^6$  N/m<sup>2</sup> (480 psia)
- (4) Total impulse\*:  $2.30 \times 10^5$  N-sec (51,600 lb-sec)
- (5) ISP\*: 227 sec
- (6) Mixture ratio (N.D.)\*\*:
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 18.5  
Minimum Power (watts): 0  
Nominal Voltage (volts): 37.0  
Maximum Voltage (volts):  
Minimum Voltage (volts):  
Converter/Inverter  
Requirement (flag):

Weight (kg): 7.67 (16.9 lb)  
Volume (cc):  $4.8 \times 10^4$  (1.7 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 5.5  
Non-Random (g):

##### Temperature

Maximum (°K): 325 (125° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI ..

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 1250.0

Test and Evaluation (\$1000): 1250.0

Unit Production (\$1000): 105.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.0

Development Lead Time Variable (months): 5.1

Qualification Lead Time Constant (months): 1.5

Qualification Lead Time Variable (months): 1.3

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0901)

Configurations: Monopropellant

Equipment Type: Isolation Valve (latching solenoid)  
(Hydraulic Research 258278)

Performance

#### Technical Characteristics

- (1) Maximum pressure:  $2.41 \times 10^6 \text{ N/m}^2$  (350 psia)
- (2) Flow area:  $0.01 \text{ cm}^2$  (0.0017 in.<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts): 0

Maximum Power (watts): 88.0

Minimum Power (watts): 0

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 33.0

Minimum Voltage (volts): 23.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.3 (0.7 lb)

Volume (cc):  $2.0 \times 10^3$  (0.07 ft<sup>3</sup>)

#### Vibration

Random (g, rms): 21.5

Non-Random (g):

#### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 200

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0902)

Configurations: Monopropellant

Equipment Type: Isolation Valve (latching solenoid) (Marquardt 22700)

# Performance

## Technical Characteristics

- |      |                   |  |
|------|-------------------|--|
| (1)  | Maximum pressure: | $2.48 \times 10^6 \text{ N/m}^2$ (360 psia)  |
| (2)  | Flow area:        | $0.77 \text{ cm}^2$ (0.12 in. <sup>2</sup> ) |
| (3)  |                   |  |
| (4)  |                   |  |
| (5)  |                   |  |
| (6)  |                   |  |
| (7)  |                   |  |
| (8)  |                   |  |
| (9)  |                   |  |
| (10) |                   |  |

## Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 0    |
| Maximum Power (watts):   | 60.0 |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 27.0 |
| Maximum Voltage (volts): | 30.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.59 (1.3 lb)

Volume (cc):  $3.7 \times 10^3$  (0.13 ft<sup>3</sup>)

## Vibration

Random (g, rms):

Non-Random (g):

## Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 278 ( 40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### DPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9} \text{ hr}$ ): 200

Standard Deviation ( $\times 10^{\pm 9} \text{ hr}$ ):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.) 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (0903)  
Configurations: Monopropellant  
Equipment Type: Isolation Valve (pyrotechnic) (Pyronetics 1349)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $2.758 \times 10^7 \text{ N/m}^2$  (4000 psia)
- (2) Flow area:  $7.7 \text{ cm}^2$  (1.2 in.<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 140.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.68 (1.5 lb)

Volume (cc):  $4.2 \times 10^3$  (0.15 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 325 (125°F)

Minimum (°K): 219 (-65°F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### DPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1001)  
 Configurations: Monopropellant  
 Equipment Type: Filter (Wintec 3181406-100)

## Performance

### Technical Characteristics

- |      |                  |   |
|------|------------------|---|
| (1)  | Maximum pressure | $6.895 \times 10^7 \text{ N/m}^2$ (1000 psia)   |
| (2)  | Flow resistance: | $1.61 \times 10^8 \text{ N/(kg-m)}^2$ ( $4.8 \times 10^3$ psi sec <sup>2</sup> /lb <sup>2</sup> ) |
| (3)  |                  |   |
| (4)  |                  |   |
| (5)  |                  |   |
| (6)  |                  |   |
| (7)  |                  |   |
| (8)  |                  |   |
| (9)  |                  |   |
| (10) |                  |   |

### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.2 (0.5 lb)
Volume (cc):	$1.4 \times 10^3$ (0.05 ft <sup>3</sup> )

### Vibration

Random (g, rms):	21.5
Non-Random (g):	

### Temperature

Maximum (°K):	333 (140° F)
Minimum (°K):	278 (40° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 10

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000) 0

Test and Evaluation (\$1000) 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1002)

Configurations: Monopropellant

Equipment Type: Filter (Wintec 15267-592)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $2.76 \times 10^6 \text{ N/m}^2$  (400 psia)
- (2) Flow resistance:  $1.19 \times 10^7 \text{ N/(kg-m)}^2$  (356  $\text{psi} \cdot \text{sec}^2/\text{lb}^2$ )
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.2 (0.5 lb)

Volume (cc):  $1.4 \times 10^3$  (0.05  $\text{ft}^3$ )

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum ( $^{\circ}\text{K}$ ): 333 ( $140^{\circ}\text{F}$ )

Minimum ( $^{\circ}\text{K}$ ): 278 ( $40^{\circ}\text{F}$ )

Pressure ( $\text{kg/m}^2$ ):

## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

10

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

7

### Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

### Schedule

Development Lead Time Constant (months):

0

Development Lead Time Variable (months):

0

Qualification Lead Time Constant (months):

0

Qualification Lead Time Variable (months):

0

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (1101)  
Configurations: Monopropellant  
Equipment Type: Tank (Arde HS D3780)

#### Performance

##### Technical Characteristics

- (1) Volume:  $1.5 \times 10^3 \text{ cm}^3$  (92 in<sup>3</sup>)
- (2) Maximum pressure:  $3.86 \times 10^6 \text{ N/m}^2$  (560 f
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA

Converter/Inverter  
Requirement (flag):

Weight (kg): 1.3 (2.8 lb)  
Volume (cc):  $1.5 \times 10^3$  (0.053 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 10.0  
Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)  
Minimum (°K): 278 ( 40° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 5

## Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1102)

Configurations: Monopropellant

Equipment Type: Tank (PSI 80156-1)

## Performance

### Technical Characteristics

- (1) Volume:  $6.88 \times 10^3 \text{ cm}^3$  (420 in<sup>3</sup>)
- (2) Maximum pressure:  $4.21 \times 10^6 \text{ N/m}^2$  (610 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

- Average Power (watts): NA
- Maximum Power (watts): NA
- Minimum Power (watts): NA
- Nominal Voltage (volts): NA
- Maximum Voltage (volts): NA
- Minimum Voltage (volts): NA

### Converter/Inverter

Requirement (flag):

Weight (kg): 1.3 (2.9 lb)

Volume (cc):  $6.8 \times 10^3$  (0.24 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

1

Word Length (bits):

8

## Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

1.0

Total Redundant Elements (No.):

5

## Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

CER

## Schedule

Development Lead Time Constant (months):

0

Development Lead Time Variable (months):

0

Qualification Lead Time Constant (months):

0

Qualification Lead Time Variable (months):

0

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (1103)  
 Configurations: Monopropellant  
 Equipment Type: Tank (PSI 80177-1)

#### Performance

##### Technical Characteristics

- (1) Volume:  $3.851 \times 10^4 \text{ cm}^3$  (2350 in.<sup>3</sup>)
- (2) Maximum pressure:  $2.76 \times 10^6 \text{ N/m}^2$  (400 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
 Maximum Power (watts): NA  
 Minimum Power (watts): NA  
 Nominal Voltage (volts): NA  
 Maximum Voltage (volts): NA  
 Minimum Voltage (volts): NA  
 Converter/Inverter  
 Requirement (flag):

Weight (kg): 4.63 (10.2 lb)  
 Volume (cc):  $3.9 \times 10^4$  (1.36 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
 Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)  
 Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):



# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

## Cost

Design Engineering (\$1000):	-0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1

Subsystem: APS (1104)  
Configurations: Monopropellant  
Equipment Type: Tank (Arde E3848)

## Performance

### Technical Characteristics

- (1) Volume:  $4.547 \times 10^4 \text{ cm}^3$  (2775 in.<sup>3</sup>)
- (2) Maximum pressure:  $2.41 \times 10^6 \text{ N/m}^2$  (350 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 7.7 (17.0 lb)  
Volume (cc):  $4.2 \times 10^4$  (1.60 ft<sup>3</sup>)

### Vibration

Random (g, rms): 8.3  
Non-Random (g):

### Temperature

Maximum (°K): 333 (140° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): . .

Time Tagged Commands (No.): . .

Other Commands (No.):

High Rate Telemetry . .

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

2

1

8

### Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

1.0

Dormancy Factor (N.D.):

3

Total Redundant Elements (No.)

### Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

CER

### Schedule

Development Lead Time Constant (months):

0

Development Lead Time Variable (months):

0

Qualification Lead Time Constant (months):

0

Qualification Lead Time Variable (months):

0

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (1105)  
Configurations: Monopropellant  
Equipment Type: Tank (PSI 80112-115)

#### Performance

##### Technical Characteristics

- |      |                   |   |
|------|-------------------|---|
| (1)  | Volume:           | $9.144 \times 10^4 \text{ cm}^3$ (5580 in. <sup>3</sup> ) |
| (2)  | Maximum pressure: | $2.41 \times 10^6 \text{ N/m}^2$ (350 psia)               |
| (3)  |                   |   |
| (4)  |                   |   |
| (5)  |                   |   |
| (6)  |                   |   |
| (7)  |                   |   |
| (8)  |                   |   |
| (9)  |                   |   |
| (10) |                   |   |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	7.85 (17.3 lb)
Volume (cc):	$9.15 \times 10^4$ (3.23 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	322 (120° F)
Minimum (°K):	278 ( 40° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  h) 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1201)  
Configurations: Monopropellant  
Equipment Type: Fill and Drain Valve (TRW DSP)  
Performance

Technical Characteristics

- (1) Maximum pressure:  $3.55 \times 10^6 \text{ N/m}^2$  (515 psia)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.09 (0.2 lb)  
Volume (cc): 570. (0.02 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 322 (120° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 70

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1202)  
Configurations: Monopropellant  
Equipment Type: Fill and Drain Valve (Hughes 3181407-110)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $3.45 \times 10^6 \text{ N/m}^2$  (600 psia)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.09 (0.2 lb)  
Volume (cc): 570 (0.02 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 21.5  
Non-Random (g):

##### Temperature

Maximum (°K): 350 (170° F)  
Minimum (°K): 222 (-60° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 70

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months) 0

Development Lead Time Variable (months) 0

Qualification Lead Time Constant (months) 0

Qualification Lead Time Variable (months) 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1301)  
Configurations: Bipropellant  
Equipment Type: Thruster (Marquardt R-6C)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 22 N (5.0 lb)
- (2) Pulse life: 30,000 cycles
- (3) Inlet pressure:  $1.31 \times 10^6$  N/m<sup>2</sup> (190 psia)
- (4) Total impulse\*:  $7.562 \times 10^5$  N-sec (170,000 lb-sec)
- (5) ISP\*: 278 sec
- (6) Mixture ratio (N.D.)\*\*: 1.5
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 32.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.68 (1.5 lb)  
Volume (cc):  $4.2 \times 10^3$  (0.15 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 394 (250° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 700

Standard Deviation ( $\times 10^{\pm 9}$  hr): 0.1

Dormancy Factor (N.D.): 12

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000): 203.0

Test and Evaluation (\$1000): 203.0

Unit Production (\$1000): 16.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 1.2

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1302)  
Configurations: Bipropellant  
Equipment Type: Thruster (Aerojet AJ10-181)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 22 N (5.0 lb)
- (2) Pulse life: 50,000 cycles
- (3) Inlet pressure:  $2.07 \times 10^6$  N/m<sup>2</sup> (300 psia)
- (4) Total impulse\*:  $2.224 \times 10^4$  N-sec (5000 lb-sec)
- (5) ISP\*: 300 sec
- (6) Mixture ratio (N. D.):\*\*1.2
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 30.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.54 (1.2 lb)  
Volume (cc):  $3.4 \times 10^3$  (0.12 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 322 (120° F)  
Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 171.0

Test and Evaluation (\$1000): 171.0

Unit Production (\$1000): 13.2

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 1.1

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1303)  
Configurations: Bipropellant  
Equipment Type: Thruster (Marquardt R- 1E)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 98 N (22.0 lb)
- (2) Pulse life: 30,000 cycles
- (3) Inlet pressure:  $1.31 \times 10^6$  N/m<sup>2</sup> (190 psia)
- (4) Total impulse\*:  $1.5 \times 10^7$  N-sec ( $3.4 \times 10^6$  lb-sec)
- (5) ISP\*: 276 sec
- (6) Mixture ratio (N. D.)\*\*:1.6
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 32.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 27.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 22.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.3 (2.9 lb)  
Volume (cc):  $8.2 \times 10^3$  (0.29 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 26.0  
Non-Random (g):

##### Temperature

Maximum (°K): 394 (250° F)  
Minimum (°K): 278 ( 40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

## Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

## Cost

Design Engineering (\$1000): 333.0

Test and Evaluation (\$1000): 333.0

Unit Production (\$1000): 26.8

Reference Quantity (No.): 3

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months) 4.5

Development Lead Time Variable (months) 1.6

Qualification Lead Time Constant (months) 2.5

Qualification Lead Time Variable (months) 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1304)  
Configurations: Bipropellant  
Equipment Type: Thruster (Bell MM P/Y)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 100 N (23.0 lb)
- (2) Pulse life: 30,000 cycles
- (3) Inlet pressure:  $1.67 \times 10^6$  N/m<sup>2</sup> (242 psia)
- (4) Total impulse\*:  $2.002 \times 10^4$  N-sec (4500 lb-sec)
- (5) ISP\*: 288 sec
- (6) Mixture ratio (N. D.):\*\*1.6
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 30.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 27.0
- Maximum Voltage (volts): 30.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter Requirement (flag):

Weight (kg): 1.2 (2.7 lb)

Volume (cc):  $7.6 \times 10^3$  (0.27 ft<sup>3</sup>)

##### Vibration

- Random (g, rms):
- Non-Random (g):

##### Temperature

- Maximum (°K): 303 (85° F)
- Minimum (°K): 289 (60° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 315.0

Test and Evaluation (\$1000): 315.0

Unit Production (\$1000): 25.1

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1305)  
Configurations: Bipropellant  
Equipment Type: Thruster (TRW MMBPS)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 390 N (88.0 lb)
- (2) Pulse life (cycles):
- (3) Inlet pressure (psia):
- (4) Total impulse\*:  $4.4 \times 10^6$  N-sec ( $1.0 \times 10^6$  lb-sec)
- (5) ISP\*: 295 sec
- (6) Mixture ratio (N. D.):\*\*1.6
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 1.0  
Maximum Power (watts): 30.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 2.6 (5.8 lb)  
Volume (cc):  $1.6 \times 10^4$  (0.58 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 700

Standard Deviation ( $\times 10^{+9}$  hr): 0.1

Dormancy Factor (N.D.): 12

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000): 560.0

Test and Evaluation (\$1000): 560.0

Unit Production (\$1000): 46.1

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 1.9

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1306)  
Configurations: Bipropellant  
Equipment Type: Thruster (Marquardt R-4D)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 445 N (100.0 lb)
- (2) Pulse life: 30,000 cycles
- (3) Inlet pressure:  $1.31 \times 10^6$  N/m<sup>2</sup> (190 psia)
- (4) Total impulse\*:  $8.9 \times 10^6$  N-sec ( $2.0 \times 10^6$  lb-sec)
- (5) ISP\*: 290 sec
- (6) Mixture ratio (N.D.)\*\*:1.6
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 1.0
- Maximum Power (watts): 112.0
- Minimum Power (watts): 0
- Nominal Voltage (volts): 27.0
- Maximum Voltage (volts): 32.0
- Minimum Voltage (volts): 22.0

Converter/Inverter  
Requirement (flag):

- Weight (kg): 2.2 (4.9 lb)
- Volume (cc):  $1.4 \times 10^4$  (0.49 ft<sup>3</sup>)

##### Vibration

- Random (g, rms):
- Non-Random (g):

##### Temperature

- Maximum (°K): 380 (225° F)
- Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 498.0

Test and Evaluation (\$1000): 498.0

Unit Production (\$1000): 40.4

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 1.9

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1307)  
Configurations: Bipropellant  
Equipment Type: Thruster (Rocketdyne RS-2101-C)  
Performance

Technical Characteristics

- (1) Thrust level: 1330 N (300.0 lb)
- (2) Pulse life (cycles):
- (3) Inlet pressure:  $1.59 \times 10^6$  N/m<sup>2</sup> (230 psia)
- (4) Total impulse\*:  $1.3 \times 10^7$  N-sec ( $3.0 \times 10^6$  lb-sec)
- (5) ISP\*: 293 sec
- (6) Mixture ratio (N. D.)\*\*:1.5
- (7)
- (8)
- (9)
- (10)

Power

- Average Power (watts): 1.0  
Maximum Power (watts): 13.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

- Weight (kg): 7.03 (15.5 lb)  
Volume (cc):  $4.2 \times 10^4$  (1.5 ft<sup>3</sup>)

Vibration

- Random (g, rms):  
Non-Random (g):

Temperature

- Maximum (°K): 303 (85° F)  
Minimum (°K): 286 (55° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

1700

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

0.1

Total Redundant Elements (No.):

12

### Cost

Design Engineering (\$1000):

1200.0

Test and Evaluation (\$1000):

1200.0

Unit Production (\$1000):

100.0

Reference Quantity (No.):

3

Factor (N.D.):

1

### Schedule

Development Lead Time Constant (months):

4.5

Development Lead Time Variable (months):

3.7

Qualification Lead Time Constant (months):

2.5

Qualification Lead Time Variable (months):

0.8

State-of-Art Factor (N.D.):

1.0

Subsystem: APS (1308)  
Configurations: Bipropellant  
Equipment Type: Thruster (Rocketdyne SS/RCS)

#### Performance

##### Technical Characteristics

- (1) Thrust level: 2670 N (600.0 lb)
- (2) Pulse life: 200,000 cycles
- (3) Inlet pressure:  $2.07 \times 10^6$  N/m<sup>2</sup> (300 psia)
- (4) Total impulse\*:  $2.67 \times 10^8$  N-sec ( $6.0 \times 10^7$  lb-sec)
- (5) ISP\*: 295 sec
- (6) Minimum inlet pressure (N/m<sup>2</sup>)
- (7)
- (8)
- (9)
- (10)

##### Power

- Average Power (watts): 1.0  
Maximum Power (watts): 12.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

- Weight (kg): 7.89 (17.4 lb)  
Volume (cc):  $4.8 \times 10^4$  (1.7 ft<sup>3</sup>)

##### Vibration

- Random (g, rms): 55.0  
Non-Random (g):

##### Temperature

- Maximum (°K): 316 (110° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

\*Applicable to monopropellant and bipropellant thrusters  
\*\*Applicable to bipropellant thrusters only



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 5

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1700

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 12

### Cost

Design Engineering (\$1000): 1300.0

Test and Evaluation (\$1000): 1300.0

Unit Production (\$1000): 112.0

Reference Quantity (No.): 3

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.5

Development Lead Time Variable (months): 3.7

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.8

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1401)

Configurations: Bipropellant

Equipment Type: Isolation Valve (latching solenoid) (Marquardt T8700)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $2.34 \times 10^6 \text{ N/m}^2$  (340 psia)
- (2) Flow area:  $0.04 \text{ cm}^2$  (0.006 in.<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 0  
Maximum Power (watts): 56  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.3 (0.6 lb)

Volume (cc):  $1.7 \times 10^3$  (0.06 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 380 (225° F)

Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):  
 Time Tagged Commands (No.):  
 Other Commands (No.):  
 High Rate Telemetry  
 Analog Points (No.):  
 Digital Points (No.):  
 Sample Rate ( $\text{sec}^{-1}$ ):  
 Word Length (bits):  
 Low Rate Telemetry  
 Analog Points (No.):  
 Digital Points (No.):  
 Sample Rate ( $\text{sec}^{-1}$ ):  
 Word Length (bits):

### Safety

Failure Model (flag): 1  
 Failure Parameters  
 Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 200  
 Standard Deviation ( $\times 10^{\pm 9}$  hr):  
 Dormancy Factor (N.D.): 1.0  
 Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0  
 Test and Evaluation (\$1000): 0  
 Unit Production (\$1000): 0  
 Reference Quantity (No.): 1  
 Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0  
 Development Lead Time Variable (months): 0  
 Qualification Lead Time Constant (months): 0  
 Qualification Lead Time Variable (months): 0  
 State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1402) .  
Configurations: Bipropellant  
Equipment Type: Isolation Valve (latching solenoid) (Marquardt 22700)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $2.48 \times 10^6 \text{ N/m}^2$  (360 psia)
- (2) ~~Minimum pressure:~~  $0.62 \text{ cm}^2$  (0.096 in.<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 0  
Maximum Power (watts): 60.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 27.0  
Maximum Voltage (volts): 30.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.59 (1.3 lb)  
Volume (cc):  $3.7 \times 10^3$  (0.13 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 322 (120° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry 1

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 200

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1403)

Configurations: Bipropellant

Equipment Type: Isolation Valve (latching solenoid)  
(Consolidated Controls 73295)

Performance

#### Technical Characteristics

- (1) Maximum pressure:  $2.48 \times 10^6 \text{ N/m}^2$  (360 psia)
- (2) Flow area:  $0.13 \text{ cm}^2$  (0.02 in.<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts): 0

Maximum Power (watts): 108.0

Minimum Power (watts): 0

Nominal Voltage (volts): 25.0

Maximum Voltage (volts): 30.0

Minimum Voltage (volts): 20.0

Converter/Inverter  
Requirement (flag)

Weight (kg): 1.2 (2.7 lb)

Volume (cc):  $7.6 \times 10^3$  (0.27 ft<sup>3</sup>)

#### Vibration

Random (g, rms): 23.2

Non-Random (g):

#### Temperature

Maximum (°K): 305 ( 90° F)

Minimum (°K): 244 (-20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):  
Time Tagged Commands (No.):  
Other Commands (No.):  
High Rate Telemetry  
Analog Points (No.):  
Digital Points (No.):  
Sample Rate ( $\text{sec}^{-1}$ ):  
Word Length (bits):  
Low Rate Telemetry  
Analog Points (No.):  
Digital Points (No.):  
Sample Rate ( $\text{sec}^{-1}$ ):  
Word Length (bits):

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	100
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	1.0
Total Redundant Elements (No.):	7

### Cost

Design Engineering (\$1000):	0
Test and Evaluation (\$1000):	0
Unit Production (\$1000):	0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
State-of-Art Factor (N.D.):	1.0

Subsystem: APS (1404)

Configurations: Bipropellant

Equipment Type: Isolation Valve (latching solenoid) (Valcor 27700-61)

## Performance

### Technical Characteristics

- (1) Maximum pressure:  $3.00 \times 10^6 \text{ N/m}^2$  (435 psia)
- (2) Flow area:  $2.9 \text{ cm}^2$  (0.45 in<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 0

Maximum Power (watts): 110.0

Minimum Power (watts): 0

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 2.7 (6.0 lb)

Volume (cc):  $1.7 \times 10^4$  (0.6 ft<sup>3</sup>)

### Vibration

Random (g, rms): 15.0

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.) 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.):

Subsystem: APS (1405)  
Configurations: Bipropellant  
Equipment Type: Isolation Valve (pyrotechnic)(Pyronetics 1349)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $2.758 \times 10^7 \text{ N/m}^2$  (4000 psia)
- (2) Flow area:  $7.7 \text{ cm}^2$  (1.2 in<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 0  
Maximum Power (watts): 140.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.68 (1.5 lb)  
Volume (cc):  $4.2 \times 10^3$  (0.15 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 325 (125° F)  
Minimum (°K): 219 (-65° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months) 0

Development Lead Time Variable (months) 0

Qualification Lead Time Constant (months) 0

Qualification Lead Time Variable (months) 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1501)  
Configurations: Bipropellant  
Equipment Type: Filter (Wintec 15267)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $2.76 \times 10^6 \text{ N/m}^2$  (400 psia)
- (2) Flow resistance:  $1.37 \times 10^8 \text{ N/(kg-m)}^2$  (4.08 psi sec<sup>2</sup>/lb<sup>2</sup>)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.4 (3.0 lb)  
Volume (cc):  $8.5 \times 10^3$  (0.3 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)  
Minimum (°K): 278 (40° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 10

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 7

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1601)  
Configurations: Bipropellant  
Equipment Type: Tank (Arde MM-3)

#### Performance

##### Technical Characteristics

- (1) Volume:  $1.27 \times 10^4 \text{ cm}^3$  (775 in<sup>3</sup>)
- (2) Maximum pressure:  $5.65 \times 10^6 \text{ N/m}^2$  (820 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 2.9 (6.5 lb)  
Volume (cc):  $1.3 \times 10^4$  (0.47 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 8.3  
Non-Random (g):

##### Temperature

Maximum (°K): 700 (800° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): .1. 0

Total Redundant Elements (No.): 5

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1. 0

Subsystem: APS (1602)  
Configurations: Bipropellant  
Equipment Type: Tank (Arde E3840)

#### Performance

##### Technical Characteristics .

- (1) Volume:  $4.424 \times 10^4 \text{ cm}^3$  (2700 in<sup>3</sup>)
- (2) Maximum pressure:  $2.41 \times 10^6 \text{ N/m}^2$  (350 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 7.7 (17.0 lb)

Volume (cc):  $1.01 \times 10^4$  (1.77 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 8.3  
Non-Random (g):

##### Temperature

Maximum (°K): 700 (800°F)  
Minimum (°K): 266 (20°F)

Pressure (kg/m<sup>2</sup>):



# Performance (continued)

## CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1603)

Configurations: Bipropellant

Equipment Type: Tank (PSI 80123-1)

#### Performance

##### Technical Characteristics

- (1) Volume:  $1.131 \times 10^5 \text{ cm}^3$  (6900 in<sup>3</sup>)
- (2) Maximum pressure:  $1.38 \times 10^6 \text{ N/m}^2$  (200 psia)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 4.76 (10.5 lb)

Volume (cc):  $1.16 \times 10^5$  (4.10 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 344 (160° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1604)  
Configurations: Bipropellant  
Equipment Type: Tank (PSI 80140-1)

#### Performance

##### Technical Characteristics

- |      |                   |                                  |                           |
|------|-------------------|----------------------------------|---------------------------|
| (1)  | Volume            | $2.130 \times 10^5 \text{ cm}^3$ | (13,000 in <sup>3</sup> ) |
| (2)  | Maximum pressure: | $2.07 \times 10^6 \text{ N/m}^2$ | (300 psia)                |
| (3)  |                   |                                  |                           |
| (4)  |                   |                                  |                           |
| (5)  |                   |                                  |                           |
| (6)  |                   |                                  |                           |
| (7)  |                   |                                  |                           |
| (8)  |                   |                                  |                           |
| (9)  |                   |                                  |                           |
| (10) |                   |                                  |                           |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	10.2 (22.5 lb)
Volume (cc):	$2.20 \times 10^5$ (7.78 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	344 (160° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

### Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

### Schedule

Development Lead Time Constant (months):	0
Development Lead Time Variable (months):	0
Qualification Lead Time Constant (months):	0
Qualification Lead Time Variable (months):	0
	1.0

Subsystem: APS (1605)  
Configurations: Bipropellant  
Equipment Type: Tank (Arde)

#### Performance

##### Technical Characteristics

- (1) Volume:  $5.080 \times 10^5 \text{ cm}^3$  (31,000 in<sup>3</sup>)
- (2) Maximum pressure:
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 68.0 (150.0 lb)  
Volume (cc):  $5.24 \times 10^5$  (18.5 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 700 (800° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 360

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 3

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

CER

## Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: APS (1701)  
Configurations: Bipropellant  
Equipment Type: Fill and Drain Valve (Pyronetics 1831)

#### Performance

##### Technical Characteristics

- (1) Maximum pressure:  $3.72 \times 10^6 \text{ N/m}^2$  (540 psia)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.09 (0.2 lb)  
Volume (cc): 570 (0.02 ft<sup>3</sup>)

##### Vibration

Random (g, rms): 14.8  
Non-Random (g):

##### Temperature

Maximum (°K): 394 (250° F)  
Minimum (°K): 233 (-40° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 70

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 1

### Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0



Subsystem: DP (0101)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (CDC 469)

#### Performance

##### Technical Characteristics

- (1) Instruction rate: 160 (kips)
- (2) Word length: 16 (bits)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 15.0  
Maximum Power (watts): 15.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.3 (2.8 lb)  
Volume (cc): 990 (0.035 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	2500
Test and Evaluation (\$1000):	1000
Unit Production (\$1000):	650
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	8.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	4.7
State-of-Art Factor (N.D.):	2.0

Subsystem: DP (0102)  
Configurations: General Purpose Processors.  
Equipment Type: General Purpose Processor (RCA MARC)

#### Performance

##### Technical Characteristics

- (1) Instruction rate: 200 kips
- (2) Word length: 32 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 20.0  
Maximum Power (watts): 20.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 6.8 (15.0 lb)  
Volume (cc):  $2.1 \times 10^3$  (0.075 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	1850
Test and Evaluation (\$1000):	1150
Unit Production (\$1000):	1000
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	8.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	4.1
State-of-Art Factor (N.D.):	2.0

Subsystem: DP (0103)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (Autonetics D216)  
Performance

Technical Characteristics

- (1) Instruction rate: 250 kips
- (2) Word length: 16 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): 80.0  
Maximum Power (watts): 80.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 6.8 (15.0 lb)  
Volume (cc):  $2.0 \times 10^3$  (0.069 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 20

High Rate Telemetry

Analog Points (No.): 6

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 15,000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 1850

Test and Evaluation (\$1000): 1150

Unit Production (\$1000): 1000

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 24.0

Development Lead Time Variable (months): 8.0

Qualification Lead Time Constant (months): 6.0

Qualification Lead Time Variable (months): 4.1

State-of-Art Factor (N.D.): 2.0



Subsystem: DP (0104)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (Bunker Ramo 1018)  
Performance

Technical Characteristics

- (1) Instruction rate: 300 kips
- (2) Word length: 16 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): 40.0  
Maximum Power (watts): 40.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 5.4 (12.0 lb)  
Volume (cc):  $2.94 \times 10^3$  (0.104 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 20

High Rate Telemetry

Analog Points (No.): 6

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 15,000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 2150

Test and Evaluation (\$1000): 1400

Unit Production (\$1000): 850

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 24.0

Development Lead Time Variable (months): 8.0

Qualification Lead Time Constant (months): 6.0

Qualification Lead Time Variable (months): 4.8

State-of-Art Factor (N.D.): 2.0

Subsystem: DP (0105)

Configurations: General Purpose Processors

Equipment Type: General Purpose Processor (Northrop RCTOT)

## Performance

### Technical Characteristics

- (1) Instruction rate: 500 kips
- (2) Word length: 24 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): 50.0  
Maximum Power (watts): 50.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 6.8 (15.0 lb)

Volume (cc):  $2.5 \times 10^3$  (0.087 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 275 (35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	2680
Test and Evaluation (\$1000):	1667
Unit Production (\$1000):	1000
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	9.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	5.9
State-of-Art Factor (N.D.):	2.0

Subsystem: DP (0106)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (Autonetics D224)

#### Performance

##### Technical Characteristics

- (1) Instruction rate: 750 kips
- (2) Word length: 24 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 140.0  
Maximum Power (watts): 140.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 11 (25.0 lb)  
Volume (cc): 820 (0.029 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	3360
Test and Evaluation (\$1000):	2310
Unit Production (\$1000):	1400
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	10.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	7.7
State-of-Art Factor (N.D.):	2.0

Subsystem: DP (0107)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (RCA SMARC)

#### Performance

##### Technical Characteristics

- (1) Instruction rate: 1000 kips
- (2) Word length: 32 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 40.0  
Maximum Power (watts): 40.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0  
Converter/Inverter  
Requirement (flag):

Weight (kg): 11 (25.0 lb)  
Volume (cc):  $2.1 \times 10^3$  (0.075 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100°F)  
Minimum (°K): 275 (35°F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{-7}$ hr):	15,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	3960
Test and Evaluation (\$1000):	2725
Unit Production (\$1000):	1400
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	13.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	9.0
State-of-Art Factor (N.D.):	2.0



Subsystem: DP (0108)  
Configurations: General Purpose Processors  
Equipment Type: General Purpose Processor (CDC AMPP)

#### Performance

##### Technical Characteristics

- (1) Instruction rate: 1200 kips
- (2) Word length: 32 bits
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): 100.0  
Maximum Power (watts): 100.0  
Minimum Power (watts): 0  
Nominal Voltage (volts): 28.0  
Maximum Voltage (volts): 32.0  
Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 9.1 (20.0 lb)  
Volume (cc):  $2.0 \times 10^3$  (0.069 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 275 (35° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	20
High Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	15,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	2

## Cost

Design Engineering (\$1000):	4300
Test and Evaluation (\$1000):	2850
Unit Production (\$1000):	1200
Reference Quantity (No.):	1
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	24.0
Development Lead Time Variable (months):	14.0
Qualification Lead Time Constant (months):	6.0
Qualification Lead Time Variable (months):	9.8
State-of-Art Factor (N.D.):	2.0

Subsystem: DP (0201)

Configurations: All

Equipment Type: Digital Telemetry Unit

#### Performance

##### Technical Characteristics

(1)	Bit rate:	0.250 kbps
(2)	Word length:	8 bits
(3)	Number of main frame words:	32
(4)	Number of subframes:	4
(5)	Number of words per subframe:	128
(6)	Digital multiplexer (yes/no):	Yes (1)
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	3.0
Maximum Power (watts):	3.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	23.0
Minimum Voltage (volts):	20.0
Converter/Inverter Requirement (flag):	

Weight (kg):	4.7 (10.4 lb)
--------------	---------------

Volume (cc):	$2.8 \times 10^4$ (1.0 ft <sup>3</sup> )
--------------	--

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	316 (110° F)
Minimum (°K):	255 ( 0° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.): . .

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

#### Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.): 4

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 8,302

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 210.0

Test and Evaluation (\$1000): 97.0

Unit Production (\$1000): 35.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.2

Development Lead Time Variable (months): 2.7

Qualification Lead Time Constant (months): 1.8

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: DP (0202)

Configurations: All

Equipment Type: Digital Telemetry Unit

# Performance

## Technical Characteristics

(1)	Bit rate:	128 kbps
(2)	Word length:	8 bits
(3)	Number of main frame words:	128
(4)	Number of subframes:	4
(5)	Number of words per subframe:	128
(6)	Digital multiplexer (yes/no):	Yes (1)
(7)		
(8)		
(9)		
(10)		

## Power

Average Power (watts):	3.0
Maximum Power (watts):	3.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	33.0
Minimum Voltage (volts):	20.0
Converter/Inverter Requirement (flag):	

Weight (kg):	4.1 (9.0 lb)
--------------	--------------

Volume (cc):	$2.5 \times 10^4$ (0.9 ft <sup>3</sup> )
--------------	--

## Vibration

Random (g, rms):	
Non-Random (g):	

## Temperature

Maximum (°K):	316 (110° F)
Minimum (°K):	255 ( 0° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	4
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	18,302
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.1
Total Redundant Elements (No.):	2

### Cost

Design Engineering (\$1000):	500.0
Test and Evaluation (\$1000):	175.0
Unit Production (\$1000):	95.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	6.2
Development Lead Time Variable (months):	4.5
Qualification Lead Time Constant (months):	1.8
Qualification Lead Time Variable (months):	0.4
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0301)  
Configurations: All  
Equipment Type: Tape Recorder (AF/NE Univ.)

#### Performance

##### Technical Characteristics

- |                        |                             |
|------------------------|-----------------------------|
| (1) Capacity:          | $6.5 \times 10^5$ bits      |
| (2) Equivalent length: | 122 m (400 ft)              |
| (3) Density:           | 59.1 bits/cm (150 bits/in.) |
| (4) Record rate:       | 1 cm/sec (0.4 in./sec)      |
| (5) Reproduce rate:    | 18 cm/sec (7.2 in./sec)     |
| (6)                    |                             |
| (7)                    |                             |
| (8)                    |                             |
| (9)                    |                             |
| (10)                   |                             |

##### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 3.0  |
| Maximum Power (watts):   | 5.0  |
| Minimum Power (watts):   | 0    |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

- |              |   |
|--------------|---|
| Weight (kg): | 4.4 (9.6 lb)                                |
| Volume (cc): | $5.89 \times 10^3$ (0.208 ft <sup>3</sup> ) |

##### Vibration

- Random (g, rms):  
Non-Random (g):

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 (35° F)  |

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): 1

Time Tagged Commands (No.):

Other Commands (No.): 5

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.): 6

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 1600

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 305.0

Test and Evaluation (\$1000): 252.0

Unit Production (\$1000): 265.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 12.0

Development Lead Time Variable (months): 8.3

Qualification Lead Time Constant (months): 8.0

Qualification Lead Time Variable (months): 1.6

State-of-Art Factor (N.D.): 1.0



Subsystem: DP (0302)  
Configurations: All  
Equipment Type: Tape Recorder (CNES/D2B)

#### Performance

##### Technical Characteristics

- |      |                    |                            |
|------|--------------------|----------------------------|
| (1)  | Capacity:          | $1.6 \times 10^6$ bits     |
| (2)  | Equivalent length: | 152 m (500 ft)             |
| (3)  | Density:           | 133 bits/cm (338 bits/in.) |
| (4)  | Record rate:       | 1.9 cm/sec (0.74 in./sec)  |
| (5)  | Reproduce rate:    | 61.5 cm/sec (24.2 in./sec) |
| (6)  |                    |                            |
| (7)  |                    |                            |
| (8)  |                    |                            |
| (9)  |                    |                            |
| (10) |                    |                            |

##### Power

Average Power (watts):	4.5
Maximum Power (watts):	7.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	4.99 (11.0 ft)
Volume (cc):	$6.48 \times 10^3$ (0.229 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr)	1600
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

## Cost

Design Engineering (\$1000):	334.0
Test and Evaluation (\$1000):	271.0
Unit Production (\$1000):	285.0
Reference Quantity (No.):	2
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0303)

Configurations: All

Equipment Type: Tape Recorder (NASA/ISS)

Performance

#### Technical Characteristics

- |      |                    |                               |
|------|--------------------|-------------------------------|
| (1)  | Capacity:          | $7.1 \times 10^6$ bits        |
| (2)  | Equivalent length: | 142 m (360 ft)                |
| (3)  | Density:           | 4318 bits/cm. (1700 bits/in.) |
| (4)  | Record rate:       | 1.5 cm/sec (0.6 in./sec)      |
| (5)  | Reproduce rate:    | 39.6 cm/sec (15.6 in./sec)    |
| (6)  |                    |                               |
| (7)  |                    |                               |
| (8)  |                    |                               |
| (9)  |                    |                               |
| (10) |                    |                               |

#### Power

Average Power (watts):	4.0
Maximum Power (watts):	8.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	4.99 (11.0 lb)
Volume (cc):	$6.40 \times 10^3$ (0.226 ft <sup>3</sup> )

#### Vibration

Random (g, rms):	
Non-Random (g):	

#### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	275 (35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	.
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{-7}$ hr):	1600
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	34.0
Test and Evaluation (\$1000):	71.0
Unit Production (\$1000):	85.0
Reference Quantity (No.):	2
Factor (N.D.):	1.

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.5
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	4.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0304)  
Configurations: All  
Equipment Type: Tape Recorder (NASA/AE)

#### Performance

##### Technical Characteristics

- |      |                    |                              |
|------|--------------------|------------------------------|
| (1)  | Capacity:          | $1.2 \times 10^8$ bits       |
| (2)  | Equivalent length: | 336 m (1200 ft)              |
| (3)  | Density:           | 1614 bits/cm (4100 bits/in.) |
| (4)  | Record rate:       | 10 cm/sec (4.0 in./sec)      |
| (5)  | Reproduce rate:    | 81 cm/sec (32 in./sec)       |
| (6)  |                    |                              |
| (7)  |                    |                              |
| (8)  |                    |                              |
| (9)  |                    |                              |
| (10) |                    |                              |

##### Power

Average Power (watts):	6.5
Maximum Power (watts):	11.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	7.26 (16.0 lb)
--------------	----------------

Volume (cc):	$1.23 \times 10^4$ (0.434 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	275 (35° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1600
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	430.0
Test and Evaluation (\$1000):	335.0
Unit Production (\$1000):	349.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0305)

Configurations: All

Equipment Type: Tape Recorder (NASA/OSO)

Performance

#### Technical Characteristics

- |      |                    |                              |
|------|--------------------|------------------------------|
| (1)  | Capacity:          | $8.5 \times 10^7$ bits       |
| (2)  | Equivalent length: | 549 m (1800 ft)              |
| (3)  | Density:           | 1575 bits/cm (4000 bits/in.) |
| (4)  | Record rate:       | 4.1 cm/sec (1.6 in./sec)     |
| (5)  | Reproduce rate:    | 81 cm/sec (32 in./sec)       |
| (6)  |                    |                              |
| (7)  |                    |                              |
| (8)  |                    |                              |
| (9)  |                    |                              |
| (10) |                    |                              |

#### Power

- |  |      |
|--|------|
| Average Power (watts):                 | 4.0  |
| Maximum Power (watts):                 | 11.0 |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

Weight (kg): 7.03 (15.5 lb)

Volume (cc):  $1.02 \times 10^4$  (0.359 ft<sup>3</sup>)

#### Vibration

- |                  |  |
|------------------|--|
| Random (g, rms): |  |
| Non-Random (g):  |  |

#### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 (35° F)  |

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1600
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	420.0
Test and Evaluation (\$1000):	330.0
Unit Production (\$1000):	341.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0



Subsystem: DP (0306)  
Configurations: All  
Equipment Type: Tape Recorder (NASA/NIMBUS-E)

Performance

Technical Characteristics

- |      |                    |                              |
|------|--------------------|------------------------------|
| (1)  | Capacity:          | $2.1 \times 10^7$ bits       |
| (2)  | Equivalent length: | 533 m (1750 ft)              |
| (3)  | Density:           | 1772 bits/cm (4500 bits/in.) |
| (4)  | Record rate:       | 107 cm/sec (42 in./sec)      |
| (5)  | Reproduce rate:    | 107 cm/sec (42 in./sec)      |
| (6)  |                    |                              |
| (7)  |                    |                              |
| (8)  |                    |                              |
| (9)  |                    |                              |
| (10) |                    |                              |

Power

- |   |      |
|---|------|
| Average Power (watts):                    | 14.5 |
| Maximum Power (watts):                    | 15.5 |
| Minimum Power (watts):                    | 0    |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

Weight (kg): 9.30 (20.5 lb)

Volume (cc):  $1.28 \times 10^4$  (0.451 ft<sup>3</sup>)

Vibration

- Random (g, rms):  
Non-Random (g):

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 ( 35° F) |

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{+9}$ hr):	1600
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	508.0
Test and Evaluation (\$1000):	385.0
Unit Production (\$1000):	400.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0307)  
Configurations: All  
Equipment Type: Tape Recorder (AF/SESP-70-1)

#### Performance

##### Technical Characteristics

- |      |                    |                                |
|------|--------------------|--------------------------------|
| (1)  | Capacity:          | $2.3 \times 10^9$ bits         |
| (2)  | Equivalent length: | 594 m (1950 ft)                |
| (3)  | Density:           | 5591 bits/cm (14,200 bits/sec) |
| (4)  | Record rate:       | 23 cm/sec (9.0 in./sec)        |
| (5)  | Reproduce rate:    | 137 cm/sec (54 in./sec)        |
| (6)  |                    |                                |
| (7)  |                    |                                |
| (8)  |                    |                                |
| (9)  |                    |                                |
| (10) |                    |                                |

##### Power

Average Power (watts):	20.0
Maximum Power (watts):	30.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	7.04 (15.5 lb)
--------------	----------------

Volume (cc):	$9.51 \times 10^3$ (0.336 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K):	311 (100° F)
---------------	--------------

Minimum (°K):	275 (35° F)
---------------	-------------

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{+9}$ hr)	1600
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N. D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	420.0
Test and Evaluation (\$1000):	330.0
Unit Production (\$1000):	341.0
Reference Quantity (No.):	2
Factor (N. D.):	1

### Schedule

Development Lead Time Constant (months)	12.0
Development Lead Time Variable (months)	8.3
Qualification Lead Time Constant (months)	8.0
Qualification Lead Time Variable (months)	1.6
State-of-Art Factor (N. D.):	1.0

Subsystem: DP (0308)  
Configurations: All  
Equipment Type: Tape Recorder (AF/STP71-2 and 72-1)  
Performance

Technical Characteristics

- |                        |                              |
|------------------------|------------------------------|
| (1) Capacity:          | $1.53 \times 10^9$ bits      |
| (2) Equivalent length: | 625 m (2050 ft)              |
| (3) Density:           | 3465 bits/cm (8800 bits/in.) |
| (4) Record rate:       | 19 cm/sec (7.3 in./sec)      |
| (5) Reproduce rate:    | 150 cm/sec (59 in./sec)      |
| (6)                    |                              |
| (7)                    |                              |
| (8)                    |                              |
| (9)                    |                              |
| (10)                   |                              |

Power

- |  |      |
|--|------|
| Average Power (watts):                 | 15.0 |
| Maximum Power (watts):                 | 25.0 |
| Minimum Power (watts):                 | 0    |
| Nominal Voltage (volts):               | 28.0 |
| Maximum Voltage (volts):               | 32.0 |
| Minimum Voltage (volts):               | 24.0 |
| Converter/Inverter Requirement (flag): |      |

- |              |   |
|--------------|---|
| Weight (kg): | 7.04 (15.5 lb)                              |
| Volume (cc): | $9.51 \times 10^3$ (0.336 ft <sup>3</sup> ) |

Vibration

- Random (g, rms):  
Non-Random (g):

Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 ( 35° F) |

- Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	5
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1600
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	420.0
Test and Evaluation (\$1000):	330.0
Unit Production (\$1000):	341.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months)	12.0
Development Lead Time Variable (months)	8.3
Qualification Lead Time Constant (months)	8.0
Qualification Lead Time Variable (months)	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0309)  
Configurations: All  
Equipment Type: Tape Recorder (AF/STP72-2)

#### Performance

##### Technical Characteristics

- |      |                    |                                |
|------|--------------------|--------------------------------|
| (1)  | Capacity:          | $1.53 \times 10^9$ bits        |
| (2)  | Equivalent length: | 549 m (1800 ft)                |
| (3)  | Density:           | 5591 bits/cm (14,200 bits/in.) |
| (4)  | Record rate:       | 5.72 cm/sec (2.25 in./sec)     |
| (5)  | Reproduce rate:    | 180 cm/sec (72 in/sec)         |
| (6)  |                    |                                |
| (7)  |                    |                                |
| (8)  |                    |                                |
| (9)  |                    |                                |
| (10) |                    |                                |

##### Power

- |   |      |
|---|------|
| Average Power (watts):                    | 14.0 |
| Maximum Power (watts):                    | 30.0 |
| Minimum Power (watts):                    | 0    |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

- |              |   |
|--------------|---|
| Weight (kg): | 7.62 (16.8 lb)                              |
| Volume (cc): | $1.06 \times 10^4$ (0.376 ft <sup>3</sup> ) |

##### Vibration

- |                  |  |
|------------------|--|
| Random (g, rms): |  |
| Non-Random (g):  |  |

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 (35° F)  |

- |                                |  |
|--------------------------------|--|
| Pressure (kg/m <sup>2</sup> ): |  |
|--------------------------------|--|

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr)	1600
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	120.0
Test and Evaluation (\$1000):	345.0
Unit Production (\$1000):	357.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0



Subsystem: DP (0310)  
Configurations: All  
Equipment Type: Tape Recorder (AF/S-3)

#### Performance

##### Technical Characteristics

- |                        |                              |
|------------------------|------------------------------|
| (1) Capacity:          | $2.0 \times 10^8$ bits       |
| (2) Equivalent length: | 294 m (966 ft)               |
| (3) Density:           | 3504 bits/cm (8900 bits/in.) |
| (4) Record rate:       | 4.67 cm/sec (1.84 in./sec)   |
| (5) Reproduce rate:    | 37.3 cm/sec (14.7 in./sec)   |
| (6)                    |                              |
| (7)                    |                              |
| (8)                    |                              |
| (9)                    |                              |
| (10)                   |                              |

##### Power

- |   |      |
|---|------|
| Average Power (watts):                    | 7.0  |
| Maximum Power (watts):                    | 14.0 |
| Minimum Power (watts):                    | 0    |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

Weight (kg): 6.58 (14.5 lb)

Volume (cc):  $9.51 \times 10^3$  (0.336 ft<sup>3</sup>)

##### Vibration

- Random (g, rms):  
Non-Random (g):

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 (-35° F) |

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1600
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	401.0
Test and Evaluation (\$1000):	318.0
Unit Production (\$1000):	330.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: DP (0311)  
Configurations: All  
Equipment Type: Tape Recorder (AF)

#### Performance

##### Technical Characteristics

(1)	Capacity:	$1.7 \times 10^9$ bits
(2)	Equivalent length:	640 m (2100 ft)
(3)	Density:	3622 bits/cm (9200 bits/in.)
(4)	Record rate:	26.2 cm/sec (10.3 in./sec)
(5)	Reproduce rate:	105 cm/sec (41.2 in./sec)
(6)		
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	8.0
Maximum Power (watts):	33.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	10.4 (23.0 lb)
Volume (cc):	$1.36 \times 10^4$ (0.480 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	275 ( 35° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	5
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	6
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1600
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	547.0
Test and Evaluation (\$1000):	410.0
Unit Production (\$1000):	420.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	12.0
Development Lead Time Variable (months):	8.3
Qualification Lead Time Constant (months):	8.0
Qualification Lead Time Variable (months):	1.6
State-of-Art Factor (N.D.):	1.0

Subsystem: CDPI (0401)

Configurations: Dual Spin

Equipment Type: Electrical Integration Assembly  
(includes converter)

Performance

#### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts):	17.1
Maximum Power (watts):	24.0
Minimum Power (watts):	9.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	9.07 (20.0 lb)
Volume (cc):	$5.7 \times 10^4$ (2.0 ft <sup>3</sup> )

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.): 3

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

#### Low Rate Telemetry

Analog Points (No.): 5

Digital Points (No.): 6

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 6500

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 107.0

Test and Evaluation (\$1000): 109.0

Unit Production (\$1000): 106.0

Reference Quantity (No.): 1

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 3.5

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.9

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: CDPI (0501)  
Configurations: Dual Spin  
Equipment Type: Switching Logic Assembly  
(includes converter)  
Performance

#### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

#### Power

Average Power (watts):	22.2
Maximum Power (watts):	30.0
Minimum Power (watts):	11.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

#### Converter/Inverter Requirement (flag):

Weight (kg):	5.44 (12.0 lb)
Volume (cc):	$3.4 \times 10^4$ (1.2 ft <sup>3</sup> )

#### Vibration

Random (g, rms):  
Non-Random (g):

#### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.): 6

Digital Points (No.): 2

Sample Rate ( $\text{sec}^{-1}$ ): 0.0075

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 6500

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): (Included

Test and Evaluation (\$1000):

Unit Production (\$1000): with

Reference Quantity (No.):

Factor (N.D.): 0401)

### Schedule

Development Lead Time Constant (months): 3.5

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): .9

Qualification Lead Time Variable (months): .2

State-of-Art Factor (N.D.): .0



Subsystem: CDPI (0601)  
Configurations: All except Dual Spin  
Equipment Type: Electrical Integration Assembly  
(includes converter)  
Performance

Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts):	4.0
Maximum Power (watts):	6.0
Minimum Power (watts):	2.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	8.71 (19.2 lb)
Volume (cc):	$5.4 \times 10^4$ (1.9 ft <sup>3</sup> )

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	6
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	38
Digital Points (No.):	15
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	4

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr)	5500
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	1963.0
Test and Evaluation (\$1000):	469.0
Unit Production (\$1000):	256.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months)	3.5
Development Lead Time Variable (months)	1.5
Qualification Lead Time Constant (months)	1.9
Qualification Lead Time Variable (months)	0.2
State-of-Art Factor (N.D.):	1.0

Subsystem: . CDPI (0701)  
Configurations: All, except Dual Spin  
Equipment Type: Auxiliary Integration Assembly  
(includes converter)  
Performance

Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts):	5.8
Maximum Power (watts):	7.5
Minimum Power (watts):	3.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 5.44 (12.0 lb)

Volume (cc):  $3.62 \times 10^3$  (0.128 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): 6

Time Tagged Commands (No.):

Other Commands (No.): 2

High Rate Telemetry

Analog Points (No.): 10

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 125

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{+9}$  hr): 6500

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): (Included

Test and Evaluation (\$1000):

Unit Production (\$1000): in

Reference Quantity (No.):

Factor (N.D.): .0601)

### Schedule

Development Lead Time Constant (months): 3.5

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 1.9

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0



Subsystem: Comm (0101)

Configurations: All except Separate Uplink and Downlink

Equipment Type: Baseband Assembly Unit

#### Performance

##### Technical Characteristics

- |      |                                    |           |
|------|------------------------------------|-----------|
| (1)  | Compatibility:                     | SGLS (1)  |
| (2)  | First data rate stream*:           | 128 kbps  |
| (3)  | Second data rate stream (Kbps):    | NA        |
| (4)  | First subcarrier frequency*:       | 1.024 MHz |
| (5)  | Second subcarrier frequency (Mhz): | NA        |
| (6)  | Transmitter requirement (T __):    | NA        |
| (7)  |                                    |           |
| (8)  |                                    |           |
| (9)  |                                    |           |
| (10) |                                    |           |

##### Power

- |  |           |
|--|-----------|
| Average Power (watts):                 | 0.52      |
| Maximum Power (watts):                 | 0.52      |
| Minimum Power (watts):                 | 0         |
| Nominal Voltage (volts):               | 28.0      |
| Maximum Voltage (volts):               | 32.0      |
| Minimum Voltage (volts):               | 24.0      |
| Converter/Inverter Requirement (flag): | C31(0701) |

Weight (kg): 0.39 (0.85 lb)

Volume (cc): 280 (0.01 ft<sup>3</sup>)

##### Vibration

- |                  |  |
|------------------|--|
| Random (g, rms): |  |
| Non-Random (g):  |  |

##### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 322 (120° F) |
| Minimum (°K): | 264 (15° F)  |

Pressure (kg/m<sup>2</sup>):

\*Second rate or frequency is the lower of the two if two are provided.

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1147
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N. D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	29.0
Test and Evaluation (\$1000):	9.0
Unit Production (\$1000):	16.0
Reference Quantity (No.):	2
Factor (N. D.):	1

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	1.8
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N. D.):	1.0

Subsystem: Comm (0102)

Configurations: All except Separate Uplink and Downlink

Equipment Type: Baseband Assembly Unit

#### Performance

##### Technical Characteristics

(1)	Compatibility:	SGLS (1)
(2)	First data rate stream*:	128 kbps
(3)	Second data rate stream (Kbps):	NA
(4)	First subcarrier frequency*:	1.024 MHz
(5)	Second subcarrier frequency (Mhz):	NA
(6)	Transmitter requirement:	T01(0303)
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	(included in T01)
Maximum Power (watts):	
Minimum Power (watts):	
Nominal Voltage (volts):	
Maximum Voltage (volts):	
Minimum Voltage (volts):	
Converter/Inverter Requirement (flag):	

Weight (kg):	(included in T01)
--------------	-------------------

Volume (cc):	(included in T01)
--------------	-------------------

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum ( $^{\circ}$ K):	333 (140 $^{\circ}$ F)
Minimum ( $^{\circ}$ K):	255 ( 0 $^{\circ}$ F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

\*Second rate or frequency is the lower of the two if two are provided.



## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	2000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	29.0
Test and Evaluation (\$1000):	9.0
Unit Production (\$1000):	16.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	1.8
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0201)

Configurations: All

Equipment Type: Antenna

#### Performance

##### Technical Characteristics

- |      |                            |              |
|------|----------------------------|--------------|
| (1)  | Frequency, high band max.: | 2300 MHz     |
| (2)  | Frequency, high band min.: | 2200 MHz     |
| (3)  | Frequency, low band max.:  | 1850 MHz     |
| (4)  | Frequency, low band min.:  | 1750 MHz     |
| (5)  | Type and equipment number: | Biconical 21 |
| (6)  | On-axis gain:              | 2 dB         |
| (7)  |                            |              |
| (8)  |                            |              |
| (9)  |                            |              |
| (10) |                            |              |

##### Power

- |  |    |
|--|----|
| Average Power (watts):                 | NA |
| Maximum Power (watts):                 | NA |
| Minimum Power (watts):                 | NA |
| Nominal Voltage (volts):               | NA |
| Maximum Voltage (volts):               | NA |
| Minimum Voltage (volts):               | NA |
| Converter/Inverter Requirement (flag): |    |

Weight (kg): 2.5 (5.6 lb)

Volume (cc):  $1.6 \times 10^5$  (5.6 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 180.0

Test and Evaluation (\$1000): 153.0

Unit Production (\$1000): 32.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0202)

Configurations: All

Equipment Type: Antenna

Perform

#### Technical Characteristics

- |      |                                 |            |
|------|---------------------------------|------------|
| (1)  | Frequency, high band max.:      | 2300 MHz   |
| (2)  | Frequency, high band min.:      | 2200 MHz   |
| (3)  | Frequency, low band max. (Mhz): | NA         |
| (4)  | Frequency, low band min. (Mhz): | NA         |
| (5)  | Type and equipment number:      | Parabola 1 |
| (6)  | On-axis gain:                   | 20 dB      |
| (7)  |                                 |            |
| (8)  |                                 |            |
| (9)  |                                 |            |
| (10) |                                 |            |

#### Power

- |   |    |
|---|----|
| Average Power (watts):                    | NA |
| Maximum Power (watts):                    | NA |
| Minimum Power (watts):                    | NA |
| Nominal Voltage (volts):                  | NA |
| Maximum Voltage (volts):                  | NA |
| Minimum Voltage (volts):                  | NA |
| Converter/Inverter<br>Requirement (flag): |    |

Weight (kg): 0.95 (2.1 lb)

Volume (cc):  $5.9 \times 10^4$  (2.1 ft<sup>3</sup>)

#### Vibration

Random (g, rms):

Non-Random (g):

#### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1.

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 40

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 104.0

Test and Evaluation (\$1000): 80.0

Unit Production (\$1000): 11.5

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0203)

Configurations: All

Equipment Type: Antenna

#### Performance

##### Technical Characteristics

(1)	Frequency, high band max.:	2300 MHz
(2)	Frequency, high band min.:	2200 MHz
(3)	Frequency, low band max.:	1850 MHz
(4)	Frequency, low band min.:	1750 MHz
(5)	Type and equipment number:	Omni 11
(6)	On-axis gain:	-9 dB
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	NA
Maximum Power (watts)	NA
Minimum Power (watts)	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts)	NA
Minimum Voltage (volts)	NA
Converter/Inverter Requirement (flag):	

Weight (kg): 0.45 (1.0 lb)

Volume (cc):  $2.8 \times 10^4$  (1.0 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 67.0

Test and Evaluation (\$1000): 46.0

Unit Production (\$1000): 12.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0204)

Configurations: All

Equipment Type: Antenna

## Performance

### Technical Characteristics

- (1) Frequency, high band max. (Mhz):
- (2) Frequency, high band min. (Mhz):
- (3) Frequency, low band max. (Mhz):
- (4) Frequency, low band min. (Mhz):
- (5) Type and equipment number: Monopole 51
- (6) On-axis gain: 2 dB
- (7)
- (8)
- (9)
- (10)

### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)

Volume (cc):  $2.8 \times 10^4$  (1.0 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):



## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 67.

Test and Evaluation (\$1000): 46.

Unit Production (\$1000): 12.

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.

Subsystem: Comm (0205)

Configurations: All

Equipment Type: Antenna

#### Performance

##### Technical Characteristics

- (1) Frequency, high band max. (Mhz):
- (2) Frequency, high band min. (Mhz):
- (3) Frequency, low band max. (Mhz):
- (4) Frequency, low band min. (Mhz):
- (5) Type and equipment number: Conical spiral 41
- (6) On-axis gain: -1 dB
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)

Volume (cc):  $2.8 \times 10^4$  (1.0 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N. D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 67.0

Test and Evaluation (\$1000): 46.0

Unit Production (\$1000): 12.0

Reference Quantity (No.): 2

Factor (N. D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N. D.): 1.0

Subsystem: Comm (0206)

Configurations: All

Equipment Type: Antenna

#### Performance

##### Technical Characteristics

- (1) Frequency, high band max. (Mhz):
- (2) Frequency, high band min. (Mhz):
- (3) Frequency, low band max. (Mhz):
- (4) Frequency, low band min. (Mhz):
- (5) Type and equipment number: Helix 31
- (6) On-axis gain: 10 dB
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA

Maximum Power (watts): NA

Minimum Power (watts): NA

Nominal Voltage (volts): NA

Maximum Voltage (volts): NA

Minimum Voltage (volts): NA

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)

Volume (cc):  $2.8 \times 10^4$  (1.0 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 100

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 1.0

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 67.0

Test and Evaluation (\$1000): 46.0

Unit Production (\$1000): 12.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 0

Development Lead Time Variable (months): 0

Qualification Lead Time Constant (months): 0

Qualification Lead Time Variable (months): 0

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0301)

Configurations: All

Equipment Type: Transmitter

## Performance

### Technical Characteristics

- |      |                                    |             |
|------|------------------------------------|-------------|
| (1)  | Special requirement code (T __ ):  | NA          |
| (2)  | Compatibility:                     | SGLS (1)    |
| (3)  | Maximum frequency:                 | 2300 MHz    |
| (4)  | Minimum frequency:                 | 2200 MHz    |
| (5)  | Power output:                      | 0.8 watts   |
| (6)  | Unified or nonunified*:            | Unified (1) |
| (7)  | First subcarrier frequency:        | 1.024 MHz   |
| (8)  | Second subcarrier frequency (Mhz): | NA          |
| (9)  | Input data rate (Mbps):            | NA          |
| (10) | Modulation type:                   | Phase (1)   |

### Power

- |  |           |
|--|-----------|
| Average Power (watts):                 | 10.0      |
| Maximum Power (watts):                 | 15.0      |
| Minimum Power (watts):                 | 5.0       |
| Nominal Voltage (volts):               | 28.0      |
| Maximum Voltage (volts):               | 32.0      |
| Minimum Voltage (volts):               | 24.0      |
| Converter/Inverter Requirement (flag): | C31 (701) |

Weight (kg): 0.839 (1.85 lb)

Volume (cc):  $5.4 \times 10^3$  (0.19 ft<sup>3</sup>)

### Vibration

- Random (g, rms):
- Non-Random (g):

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 322 (120° F) |
| Minimum (°K): | 264 (15° F)  |

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	336
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	50.0
Test and Evaluation (\$1000):	50.0
Unit Production (\$1000):	20.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	5.0
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	0.4
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0302)

Configurations: All

Equipment Type: Transmitter

## Performance

### Technical Characteristics

- |      |                                    |                |
|------|------------------------------------|----------------|
| (1)  | Special requirement code (T __ ):  | NA             |
| (2)  | Compatibility:                     | SGLS (1)       |
| (3)  | Maximum frequency:                 | 2300 MHz       |
| (4)  | Minimum frequency:                 | 2200 MHz       |
| (5)  | Power output:                      | 1.6 watts      |
| (6)  | Unified or nonunified*:            | Nonunified (0) |
| (7)  | First subcarrier frequency (Mhz):  | NA             |
| (8)  | Second subcarrier frequency (Mhz): | NA             |
| (9)  | Input data rate:                   | 1.024 Mbps     |
| (10) | Modulation type:                   | Phase (1)      |

### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 16.0 |
| Maximum Power (watts):   | 24.0 |
| Minimum Power (watts):   | 8.0  |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter Requirement (flag):	C31 (0701)
---	------------

Weight (kg):	0.95 (2.1 lb)
--------------	---------------

Volume (cc):	$5.9 \times 10^4$ (0.21 ft <sup>3</sup> )
--------------	---

### Vibration

- |                  |  |
|------------------|--|
| Random (g, rms): |  |
| Non-Random (g):  |  |

### Temperature

- |               |              |
|---------------|--------------|
| Maximum (°K): | 311 (100° F) |
| Minimum (°K): | 275 (35° F)  |

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.



## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	1022
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	231.0
Test and Evaluation (\$1000):	84.4
Unit Production (\$1000):	30.7
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	10.7
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	1.2
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0303)  
Configurations: All  
Equipment Type: Transmitter

#### Performance

##### Technical Characteristics

(1)	Special requirement code:	T01 (0102)
(2)	Compatibility:	5GLS (1)
(3)	Maximum frequency:	2300 MHz
(4)	Minimum frequency:	2200 MHz
(5)	Power output:	2 watts
(6)	Unified or nonunified*:	Unified (1)
(7)	First subcarrier frequency:	1.024 MHz
(8)	Second subcarrier frequency (Mhz):	NA
(9)	Input data rate (Mbps):	NA
(10)	Modulation type:	Phase (1)

##### Power

Average Power (watts):	10.0
Maximum Power (watts):	15.0
Minimum Power (watts):	5.0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	36.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg): 1.1 (2.4 lb)

Volume (cc):  $1.2 \times 10^3$  (0.042 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 255 ( 0° F)

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.

C-4

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	14
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	27.0
Test and Evaluation (\$1000):	33.0
Unit Production (\$1000):	25.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	2.1
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0304)

Configurations: All

Equipment Type: Transmitter

#### Performance

##### Technical Characteristics

- |      |                                    |                |
|------|------------------------------------|----------------|
| (1)  | Special requirement code (T __ ):  | NA             |
| (2)  | Compatibility:                     | USB (2)        |
| (3)  | Maximum frequency (Mhz):           |                |
| (4)  | Minimum frequency (Mhz):           |                |
| (5)  | Power output:                      | 5 watts        |
| (6)  | Unified or nonunified*:            | Nonunified (0) |
| (7)  | First subcarrier frequency (Mhz):  | NA             |
| (8)  | Second subcarrier frequency (Mhz): | NA             |
| (9)  | Input data rate:                   | 0.308 Mbps     |
| (10) | Modulation type:                   | Frequency (2)  |

##### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 60.0 |
| Maximum Power (watts):   | 90.0 |
| Minimum Power (watts):   | 30.0 |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.4 (0.9 lb)

Volume (cc): 230 (0.0081 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 261 (10° F)

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,000
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	90.0
Test and Evaluation (\$1000):	175.0
Unit Production (\$1000):	31.0
Reference Quantity (No.):	4
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	9.6
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	1.0
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0305)

Configurations: All

Equipment Type: Transmitter

## Performance

### Technical Characteristics

- |      |                                    |             |
|------|------------------------------------|-------------|
| (1)  | Special requirement code (T _ _ ): | NA          |
| (2)  | Compatibility:                     | SGLS (1)    |
| (3)  | Maximum frequency:                 | 2300 MHz    |
| (4)  | Minimum frequency:                 | 2200 MHz    |
| (5)  | Power output:                      | 10 watts    |
| (6)  | Unified or non-unified*:           | Unified (1) |
| (7)  | First subcarrier frequency         | 1.024 MHz   |
| (8)  | Second subcarrier frequency (Mhz): | NA          |
| (9)  | Input data rate (Mbps):            | NA          |
| (10) | Modulation type:                   | Phase (1)   |

### Power

- |   |      |
|---|------|
| Average Power (watts):                    | 40.0 |
| Maximum Power (watts):                    | 50.0 |
| Minimum Power (watts):                    | 20.0 |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

Weight (kg): 1.1 (2.5 lb)

Volume (cc): 570 (0.020 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 264 ( 15° F)

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.

## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	100.0
Test and Evaluation (\$1000):	100.0
Unit Production (\$1000):	25.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	7.9
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	0.8
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0306)

Configurations: All

Equipment Type: Transmitter

## Performance

### Technical Characteristics

- |      |                                    |             |
|------|------------------------------------|-------------|
| (1)  | Special requirement code (T _ _):  | NA          |
| (2)  | Compatibility:                     | SGLS (1)    |
| (3)  | Maximum frequency:                 | 2300 MHz    |
| (4)  | Minimum frequency:                 | 2200 MHz    |
| (5)  | Power output:                      | 20 watts    |
| (6)  | Unified or nonunified*:            | Unified (1) |
| (7)  | First subcarrier frequency:        | 1.024 MHz   |
| (8)  | Second subcarrier frequency (Mhz): | NA          |
| (9)  | Input data rate (Mbps):            | NA          |
| (10) | Modulation type:                   | Phase (1)   |

### Power

- |                          |       |
|--------------------------|-------|
| Average Power (watts):   | 90.0  |
| Maximum Power (watts):   | 110.0 |
| Minimum Power (watts):   | 50.0  |
| Nominal Voltage (volts): | 28.0  |
| Maximum Voltage (volts): | 32.0  |
| Minimum Voltage (volts): | 24.0  |

Converter/Inverter  
Requirement (flag):

Weight (kg): 1.25 (2.75 lb)

Volume (cc): 570 (0.020 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 264 (15° F)

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.



## Performance (continued)

### CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	110.0
Test and Evaluation (\$1000):	110.0
Unit Production (\$1000):	27.5
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	8.5
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	0.8
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm. (0307)

Configurations: All

Equipment Type: Transmitter

## Performance

### Technical Characteristics

- |      |                                    |             |
|------|------------------------------------|-------------|
| (1)  | Special requirement code (T __ ):  | NA          |
| (2)  | Compatibility:                     | SGLS (1)    |
| (3)  | Maximum frequency:                 | 2300 MHz    |
| (4)  | Minimum frequency:                 | 2200 MHz    |
| (5)  | Power output:                      | 5 watts     |
| (6)  | Unified or nonunified*:            | Unified (1) |
| (7)  | First subcarrier frequency:        | 1.024 MHz   |
| (8)  | Second subcarrier frequency (Mhz): | NA          |
| (9)  | Input data rate (Mbps):            | NA          |
| (10) | Modulation type:                   | Phase (1)   |

### Power

- |   |      |
|---|------|
| Average Power (watts):                    | 20.0 |
| Maximum Power (watts):                    | 26.0 |
| Minimum Power (watts):                    | 10.0 |
| Nominal Voltage (volts):                  | 28.0 |
| Maximum Voltage (volts):                  | 32.0 |
| Minimum Voltage (volts):                  | 24.0 |
| Converter/Inverter<br>Requirement (flag): |      |

Weight (kg): 1.02 (2.25 lb)

Volume (cc): 570 (0.020 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 264 ( 15° F)

Pressure (kg/m<sup>2</sup>):

\*Nonunified requires (7) and (8) to be blank. Unified requires (9) to be blank.

Performance (continued)

CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	12
High Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry	
Analog Points (No.):	6
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	14,000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

Cost

Design Engineering (\$1000):	90.0
Test and Evaluation (\$1000):	80.0
Unit Production (\$1000):	22.5
Reference Quantity (No.):	2
Factor (N.D.):	1

Schedule

Development Lead Time Constant (months):	11.7
Development Lead Time Variable (months):	7.1
Qualification Lead Time Constant (months):	3.4
Qualification Lead Time Variable (months):	0.6
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0401)

Configurations: All

Equipment Type: Receiver

## Performance

### Technical Characteristics

- |      |  |                 |
|------|--|-----------------|
| (1)  | Compatibility, range and range rate:       | SGLS (1)        |
| (2)  | Maximum frequency:                         | 1850 MHz        |
| (3)  | Minimum frequency:                         | 1750 MHz        |
| (4)  | Modulation type:                           | Phase (1)       |
| (5)  | Maximum command rate (baud or bps):        | 1000            |
| (6)  | Command output type:                       | Ternary FSK (3) |
| (7)  | $F_1$ :                                    | 65 kHz          |
| (8)  | $F_2$ :                                    | 76 kHz          |
| (9)  | $F_3$ :                                    | 95 kHz          |
| (10) | Signal conditioner requirement<br>(SC __): | NA              |

### Power

- |                          |      |
|--------------------------|------|
| Average Power (watts):   | 3.0  |
| Maximum Power (watts):   | 4.0  |
| Minimum Power (watts):   | 1.0  |
| Nominal Voltage (volts): | 28.0 |
| Maximum Voltage (volts): | 32.0 |
| Minimum Voltage (volts): | 24.0 |

Converter/Inverter Requirement (flag):	C30 (702)
---	-----------

Weight (kg):	1.8 (4.0 lb)
--------------	--------------

Volume (cc):	$1.1 \times 10^4$ (0.4 ft <sup>3</sup> )
--------------	--

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K):	322 (120° F)
---------------	--------------

Minimum (°K):	264 (15° F)
---------------	-------------

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

# Performance (continued)

## CDPI

Power Switching Commands (No.):	2
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	7
Sample Rate ( $\text{sec}^{-1}$ ):	125
Word Length (bits):	8
Low Rate Telemetry:	
Analog Points (No.):	2
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	4206
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

## Cost

Design Engineering (\$1000):	76.0
Test and Evaluation (\$1000):	71.0
Unit Production (\$1000):	35.0
Reference Quantity (No.):	2
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	4.2
Development Lead Time Variable (months):	4.3
Qualification Lead Time Constant (months):	7.1
Qualification Lead Time Variable (months):	2.9
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0402)

Configurations: All

Equipment Type: Receiver

## Performance

### Technical Characteristics

- (1) Compatibility, range and range rate: SGLS (1)
- (2) Maximum frequency: 1850 MHz
- (3) Minimum frequency: 1750 MHz
- (4) Modulation type: Phase (1)
- (5) Maximum command rate (baud or bps): 1000
- (6) Command output type: Ternary FSK (3)
- (7)  $F_1$ : 65 kHz
- (8)  $F_2$ : 76 kHz
- (9)  $F_3$ : 95 kHz
- (10) Signal conditioner requirement: SC01 (0501)

### Power

- Average Power (watts): 3.25
- Maximum Power (watts): 5.0
- Minimum Power (watts): 1.1
- Nominal Voltage (volts): 28.0
- Maximum Voltage (volts): 36.0
- Minimum Voltage (volts): 24.0
- Converter/Inverter Requirement (flag):

Weight (kg): 1.6 (3.6 lb)

Volume (cc):  $1.2 \times 10^3$  (0.042 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 333 (140° F)

Minimum (°K): 255 ( 0° F)

Pressure (kg/m<sup>2</sup>):

Performance (continued).

CDPI

Power Switching Commands (No.): 1

Time Tagged Commands (No.):

Other Commands (No.): 2

High Rate Telemetry

Analog Points (No.): 2

Digital Points (No.): 7

Sample Rate ( $\text{sec}^{-1}$ ): 125

Word Length (bits): 8

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 3000

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N. D.): 0.5

Total Redundant Elements (No.): 3

Cost

Design Engineering (\$1000): 72.0

Test and Evaluation (\$1000): 160.0

Unit Production (\$1000): 34.0

Reference Quantity (No.): 2

Factor (N. D.): 1

Schedule

Development Lead Time Constant (months): 4.2

Development Lead Time Variable (months): 3.8

Qualification Lead Time Constant (months): 7.1

Qualification Lead Time Variable (months): 2.5

State-of-Art Factor (N. D.): 1.0

Subsystem: Comm (0501)  
Configurations: All  
Equipment Type: Command Signal Conditioner  
Performance

Technical Characteristics

- |                               |                 |
|-------------------------------|-----------------|
| (1) Compatibility:            | SGLS (1)        |
| (2) Special requirement code: | SC01 (0402)     |
| (3) Command input:            | Ternary FSK (3) |
| (4) $F_1$ :                   | 65 kHz          |
| (5) $F_2$ :                   | 76 kHz          |
| (6) $F_3$ :                   | 95 kHz          |
| (7) Maximum command rate:     | 1000 baud       |
| (8)                           |                 |
| (9)                           |                 |
| (10)                          |                 |

Power

Average Power (watts):	(included in receiver)
Maximum Power (watts):	
Minimum Power (watts):	
Nominal Voltage (volts):	
Maximum Voltage (volts)	
Minimum Voltage (volts)	
Converter/Inverter Requirement (flag):	

Weight (kg):	(included in receiver)
--------------	------------------------

Volume (cc):	(included in receiver)
--------------	------------------------

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum ( $^{\circ}$ K):	333 ( $140^{\circ}$ F)
Minimum ( $^{\circ}$ K):	255 ( $0^{\circ}$ F)

Pressure ( $\text{kg}/\text{m}^2$ ):



## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	3000
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	36.0
Test and Evaluation (\$1000):	27.0
Unit Production (\$1000):	25.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	1.8
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0502)  
Configurations: All  
Equipment Type: Command Signal Conditioner

#### Performance

##### Technical Characteristics

(1)	Compatibility:	SGLS (1)
(2)	Special requirement code (SC __):	NA
(3)	Command input:	Ternary FSK (3)
(4)	F <sub>1</sub> :	65 kHz
(5)	F <sub>2</sub> :	76 kHz
(6)	F <sub>3</sub> :	95 kHz
(7)	Maximum command rate:	1000 baud
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	1.0
Minimum Power (watts):	0.5
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0

Converter/Inverter Requirement (flag):	C30 (0702)
---	------------

Weight (kg):	0.612 (1.35 lb)
--------------	-----------------

Volume (cc):	$4.0 \times 10^3$ (0.14 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	322 (120° F)
Minimum (°K):	264 ( 15° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	2
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	2296
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

### Cost

Design Engineering (\$1000):	36.0
Test and Evaluation (\$1000):	27.0
Unit Production (\$1000):	25.0
Reference Quantity (No.):	2
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	7.3
Development Lead Time Variable (months):	3.1
Qualification Lead Time Constant (months):	1.8
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0601)  
Configurations: Configurations Having Common Antenna  
Equipment Type: Diplexer

#### Performance

##### Technical Characteristics

(1)	Compatibility:	SGLS (1)
(2)	Max. receive frequency:	1850 MHz
(3)	Min. receive frequency:	1750 MHz
(4)	Max. transmit frequency:	2300 MHz
(5)	Min. transmit frequency:	2200 MHz
(6)	Max. allowable transmit power:	7 watts
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	1.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	0.34 (0.75 lb)
Volume (cc):	510 (0.018 ft <sup>3</sup> )

##### Vibration

Random (g, rms):
Non-Random (g):

##### Temperature

Maximum (°K):	344 (160° F)
Minimum (°K):	239 (-30° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 1

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 130

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 10.0

Test and Evaluation (\$1000): 6.0

Unit Production (\$1000): 7.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.2

Development Lead Time Variable (months): 1.6

Qualification Lead Time Constant (months): 0.9

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0602)

Configurations: Configurations Having Common Antenna

Equipment Type: Diplexer

#### Performance

##### Technical Characteristics

(1)	Compatibility:	SGLS (1)
(2)	Max. receive frequency:	1850 MHz
(3)	Min. receive frequency:	1750 MHz
(4)	Max. transmit frequency:	2300 MHz
(5)	Min. transmit frequency:	2200 MHz
(6)	Max. allowable transmit power:	20 watts
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	1.0
Maximum Power (watts):	1.0
Minimum Power (watts):	0
Nominal Voltage (volts):	28.0
Maximum Voltage (volts):	32.0
Minimum Voltage (volts):	24.0
Converter/Inverter Requirement (flag):	

Weight (kg):	0.82 (1.8 lb)
Volume (cc):	990 (0.035 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	344 (160° F)
Minimum (°K):	239 (-30° F)

Pressure (kg/m <sup>2</sup> ):	
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## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 1

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 130

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 2

### Cost

Design Engineering (\$1000): 14.2

Test and Evaluation (\$1000): 10.0

Unit Production (\$1000): 11.2

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 4.2

Development Lead Time Variable (months): 2.0

Qualification Lead Time Constant (months): 0.9

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: Comm (0701)

Configurations:

Equipment Type: Power Converter (Transmitter)

Performance

Technical Characteristics

(1) Special requirement code: C31 (0701)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

Power

Average Power (watts): 13.5

Maximum Power (watts) 20.0

Minimum Power (watts) 10.0

Nominal Voltage (volts) 28.0

Maximum Voltage (volt) 32.0

Minimum Voltage (volts) 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.794 (1.75 lb)

Volume (cc):  $5.1 \times 10^3$  (0.18 ft<sup>3</sup>)

Vibration

Random (g, rms):

Non-Random (g):

Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 264 ( 15° F)

Pressure (kg/m<sup>2</sup>):



# Performance (continued)

## CDPI

Power Switching Commands (No.):	1
Time Tagged Commands (No.):	
Other Commands (No.):	
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	1
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	872
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	3

## Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months):	7.4
Development Lead Time Variable (months):	3.2
Qualification Lead Time Constant (months):	2.5
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

Subsystem: Comm (0702)

Configurations:

Equipment Type: Power Converter (Receiver)

Performance

Technical Characteristics

(1) Special requirement code: C30 (0702)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

Power

Average Power (watts): 7.63

Maximum Power (watts): 10.0

Minimum Power (watts): 3.8

Nominal Voltage (volts): 28.0

Maximum Voltage (volts): 32.0

Minimum Voltage (volts): 24.0

Converter/Inverter  
Requirement (flag):

Weight (kg): 0.794 (1.75 lb)

Volume (cc):  $5.1 \times 10^3$  (0.18 ft<sup>3</sup>)

Vibration

Random (g, rms):

Non-Random (g):

Temperature

Maximum (°K): 322 (120° F)

Minimum (°K): 264 (15° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.): 1

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 1

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 882

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 3

## Cost

Design Engineering (\$1000):	0	} CER
Test and Evaluation (\$1000):	0	
Unit Production (\$1000):	0	
Reference Quantity (No.):	1	
Factor (N.D.):	1	

## Schedule

Development Lead Time Constant (months): 7.4

Development Lead Time Variable (months): 3.2

Qualification Lead Time Constant (months): 2.5

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0



Subsystem: EP (0101)

Configurations: Shunt & Shunt and Discharge Regulation

Equipment Type: Shunt Regulator

#### Performance

##### Technical Characteristics

- (1) Maximum power capacity: 62.6 watt
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	1.9 (4.2 lb)
--------------	--------------

Volume (cc):	$2.8 \times 10^4$ (1.0 ft <sup>3</sup> )
--------------	--

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	373 (212° F)
Minimum (°K):	218 (-67° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

# Performance (continued)

## CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	200
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

## Cost

Design Engineering (\$1000):	80.0
Test and Evaluation (\$1000):	40.0
Unit Production (\$1000):	7.0
Reference Quantity (No.):	4
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	9.5
Development Lead Time Variable (months):	7.4
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.6
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (0102)

Configurations: Shunt & Shunt and Discharge Regulation

Equipment Type: Shunt Regulator

#### Performance

##### Technical Characteristics

- (1) Maximum power capacity: 62.0 watts
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg): 2.0 (4.4 lb)

Volume (cc):  $1.2 \times 10^4$  (0.44 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 373 (212° F)

Minimum (°K): 218 (-67° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.	
Time Tagged Commands (No.):	
Other Commands (No.):	1
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	.00
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	80.0
Test and Evaluation (\$1000):	40.0
Unit Production (\$1000):	7.0
Reference Quantity (No.):	4
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	9.5
Development Lead Time Variable (months):	3.6
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N.D.):	1.0



Subsystem: EP (0201)  
Configurations: All  
Equipment Type: Battery cell  
Performance

Technical Characteristics

(1)	Capacity:	3.0 amp-hr
(2)	Watt/hour charge efficiency (N.D.):	0.65
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg): 0.14 (0.30 lb)

Volume (cc): 66.3 (0.00234 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 51.0

Test and Evaluation (\$1000): 59.0

Unit Production (\$1000): 24.5

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.0

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0202)  
Configurations: All  
Equipment Type: Battery cell  
Performance

Technical Characteristics

(1)	Capacity:	4.0 amp-hr
(2)	Watt/hour charge efficiency (N.D.):	0.65
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.15 (0.34 lb)
Volume (cc):	68.8 (0.00243 ft <sup>3</sup> )

Vibration

Random (g, rms):	
Non-Random (g):	

Temperature

Maximum (°K):	300 (80.6°F)
Minimum (°K):	277 (39.2°F)

Pressure (kg/m <sup>2</sup> ):	
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## Performance (continued)

### CDPI

Power Switching Commands (N

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 8

Word Length (bits):

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 55.0

Test and Evaluation (\$1000): 62.0

Unit Production (\$1000): 26.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.1

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0203)

Configurations: All

Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- (1) Capacity: 6.5 amp-hr
- (2) Watt/hour charge efficiency (N.D.): 0.65
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg): 0.27 (0.60 lb)

Volume (cc): 110 (0.0040 ft<sup>3</sup>)

##### Vibration

Random (g, rms)

Non-Random (g):

##### Temperature

Maximum (°K): 300 (80.6° F)

Minimum (°K): 277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

- Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 64.0

Test and Evaluation (\$1000): 82.0

Unit Production (\$1000): 32.5

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.4

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0204)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- |   |            |
|---|------------|
| (1) Capacity:                           | 7.0 amp-hr |
| (2) Watt/hour charge efficiency (N.D.): | 0.65       |
| (3)                                     |            |
| (4)                                     |            |
| (5)                                     |            |
| (6)                                     |            |
| (7)                                     |            |
| (8)                                     |            |
| (9)                                     |            |
| (10)                                    |            |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.28 (0.62 lb)
--------------	----------------

Volume (cc):	105 (0.00372 ft <sup>3</sup> )
--------------	--------------------------------

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.)

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Safety

Failure Model (flag):

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.):

### Cost

Design Engineering (\$1000):

Test and Evaluation (\$1000):

Unit Production (\$1000):

Reference Quantity (No.):

Factor (N.D.):

### Schedule

Development Lead Time Constant (months):

Development Lead Time Variable (months):

Qualification Lead Time Constant (months):

Qualification Lead Time Variable (months):

State-of-Art Factor (N.D.):



Subsystem: EP (0205)  
Configurations: All  
Equipment Type: Battery cell  
Performance

Technical Characteristics

(1) Capacity:	10.0 amp-hr
(2) Watt/hour charge efficiency (N.D.):	0.65
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.32 (0.70 lb)
Volume (cc):	127 (0.00449 ft <sup>3</sup> )

Vibration

Random (g, rms):	
Non-Random (g):	

Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 241.0

Test and Evaluation (\$1000): 88.0

Unit Production (\$1000): 34.5

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0206)  
Configurations: All  
Equipment Type: Battery cell  
Performance

Technical Characteristics

(1) Capacity:	11.0 amp-hr
(2) Watt/hour charge efficiency (N.D.):	0.65
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.38 (0.83 lb)
--------------	----------------

Volume (cc):	143 (0.00506 ft <sup>3</sup> )
--------------	--------------------------------

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 255.0

Test and Evaluation (\$1000): 95.0

Unit Production (\$1000): 37.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.7

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0207)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- |   |             |
|---|-------------|
| (1) Capacity:                           | 12.0 amp-hr |
| (2) Watt/hour charge efficiency (N.D.): | 0.65        |
| (3)                                     |             |
| (4)                                     |             |
| (5)                                     |             |
| (6)                                     |             |
| (7)                                     |             |
| (8)                                     |             |
| (9)                                     |             |
| (10)                                    |             |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.454 (10.0 lb)
Volume (cc):	180 (0.00637 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 270.0

Test and Evaluation (\$1000): 102.0

Unit Production (\$1000): 39.5

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 1.8

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0208)  
Configurations: All  
Equipment Type: Battery cell

Performance

Technical Characteristics

(1) Capacity:	14.0 amp-hr
(2) Watt/hour charge efficiency (N.D.):	0.65
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts)	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.522 (1.15 lb)
Volume (cc):	208 (0.00734 ft <sup>3</sup> )

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 295.0

Test and Evaluation (\$1000): 111.0

Unit Production (\$1000): 42.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.0

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0



Subsystem: EP (0209)  
 Configurations: All  
 Equipment Type: Battery cell  
 Performance

#### Technical Characteristics

(1) Capacity:	17.0 amp-hr
(2) Watt/hour charge efficiency (N. D.):	0.65
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

#### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts)	NA
Minimum Voltage (volts)	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.612 (1.35 lb)
Volume (cc):	216 (0.00763 ft <sup>3</sup> )

#### Vibration

Random (g, rms):	
Non-Random (g):	

#### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 330.0

Test and Evaluation (\$1000): 120.0

Unit Production (\$1000): 44.8

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.1

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0210)  
 Configurations: All  
 Equipment Type: Battery cell  
 Performance

#### Technical Characteristics

- |  |             |
|--|-------------|
| (1) Capacity:                            | 18.0 amp-hr |
| (2) Watt/hour charge efficiency (N. D.): | 0.65        |
| (3)                                      |             |
| (4)                                      |             |
| (5)                                      |             |
| (6)                                      |             |
| (7)                                      |             |
| (8)                                      |             |
| (9)                                      |             |
| (10)                                     |             |

#### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.721 (1.59 lb)
Volume (cc):	442 (0.0156 ft <sup>3</sup> )

#### Vibration

Random (g, rms):	
Non-Random (g):	

#### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 340.0

Test and Evaluation (\$1000): 129.0

Unit Production (\$1000): 47.6

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.3

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0211)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

(1) Capacity:	26.0 amp-hr
(2) Watt/hour charge efficiency (N. D.):	0.65
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.91 (2.0 lb)
Volume (cc):	306 (0.0108 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

## Cost

Design Engineering (\$1000): 421.0

Test and Evaluation (\$1000): 143.0

Unit Production (\$1000): 52.2

Reference Quantity (No.): 2

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.6

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0212)

Configurations: All

Equipment Type: Battery cell

Performance

Technical Characteristics

- |   |             |
|---|-------------|
| (1) Capacity:                           | 26.0 amp-hr |
| (2) Watt/hour charge efficiency (N.D.): | 0.65        |
| (3)                                     |             |
| (4)                                     |             |
| (5)                                     |             |
| (6)                                     |             |
| (7)                                     |             |
| (8)                                     |             |
| (9)                                     |             |
| (10)                                    |             |

Power

- |  |    |
|--|----|
| Average Power (watts):                 | NA |
| Maximum Power (watts):                 | NA |
| Minimum Power (watts):                 | NA |
| Nominal Voltage (volts):               | NA |
| Maximum Voltage (volts):               | NA |
| Minimum Voltage (volts):               | NA |
| Converter/Inverter Requirement (flag): |    |

Weight (kg): 0.91 (2.0 lb)

Volume (cc): 340 (0.0120 ft<sup>3</sup>)

Vibration

Random (g, rms):

Non-Random (g):

Temperature

Maximum (°K): 300 (80.6° F)

Minimum (°K): 277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): .8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 421.0

Test and Evaluation (\$1000): 143.0

Unit Production (\$1000): 52.2

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.6

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0



Subsystem: EP (0213)

Configurations: All

Equipment Type: Battery cell

## Performance

### Technical Characteristics

(1) Capacity: 28.0 amp-hr

(2) Watt/hour charge efficiency (N.D.): 0.65

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

### Power

Average Power (watts): NA

Maximum Power (watts): NA

Minimum Power (watts): NA

Nominal Voltage (volts): NA

Maximum Voltage (volts): NA

Minimum Voltage (volts): NA

Converter/Inverter  
Requirement (flag):

Weight (kg): 1.0 (2.3 lb)

Volume (cc): 413 (0.0146 ft<sup>3</sup>)

### Vibration

Random (g, rms):

Non-Random (g):

### Temperature

Maximum (°K): 300 (80.6° F)

Minimum (°K): 277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.): . . .

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr): ..

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 440.0

Test and Evaluation (\$1000): 151.0

Unit Production (\$1000): 55.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.8

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0214)

Configurations: All

Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- |  |             |
|--|-------------|
| (1) Capacity:                            | 33.0 amp-hr |
| (2) Watt/hour charge efficiency (N. D.): | 0.65        |
| (3)                                      |             |
| (4)                                      |             |
| (5)                                      |             |
| (6)                                      |             |
| (7)                                      |             |
| (8)                                      |             |
| (9)                                      |             |
| (10)                                     |             |

##### Power

- |  |    |
|--|----|
| Average Power (watts):                 | NA |
| Maximum Power (watts):                 | NA |
| Minimum Power (watts):                 | NA |
| Nominal Voltage (volts):               | NA |
| Maximum Voltage (volts):               | NA |
| Minimum Voltage (volts):               | NA |
| Converter/Inverter Requirement (flag): |    |

Weight (kg): 1.1 (2.4 lb)

Volume (cc): 326 (0.0115 ft<sup>3</sup>)

##### Vibration

- Random (g, rms):
- Non-Random (g):

##### Temperature

- |               |               |
|---------------|---------------|
| Maximum (°K): | 300 (80.6° F) |
| Minimum (°K): | 277 (39.2° F) |

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 485.0

Test and Evaluation (\$1000): 155.0

Unit Production (\$1000): 56.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 2.9

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0215)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- |      |                                     |             |
|------|-------------------------------------|-------------|
| (1)  | Capacity:                           | 40.0 amp-hr |
| (2)  | Watt/hour charge efficiency (N.D.): | 0.65        |
| (3)  |                                     |             |
| (4)  |                                     |             |
| (5)  |                                     |             |
| (6)  |                                     |             |
| (7)  |                                     |             |
| (8)  |                                     |             |
| (9)  |                                     |             |
| (10) |                                     |             |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts)	NA
Minimum Voltage (volts)	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	1.3 (2.8 lb)
Volume (cc):	487 (0.0172 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 542.0

Test and Evaluation (\$1000): 167.0

Unit Production (\$1000): 60.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 3.0

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0216)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- |   |             |
|---|-------------|
| (1) Capacity:                           | 50.0 amp-hr |
| (2) Watt/hour charge efficiency (N.D.): | 0.65        |
| (3)                                     |             |
| (4)                                     |             |
| (5)                                     |             |
| (6)                                     |             |
| (7)                                     |             |
| (8)                                     |             |
| (9)                                     |             |
| (10)                                    |             |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts)	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	1.6 (3.6 lb)
--------------	--------------

Volume (cc):	590 (0.0207 ft <sup>3</sup> )
--------------	-------------------------------

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 620.0

Test and Evaluation (\$1000): 188.0

Unit Production (\$1000): 66.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 3.5

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0



Subsystem: EP (0217)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

- (1) Capacity: 60.0 amp-hr
- (2) Watt/hour charge efficiency (N. D.): 0.65
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.8 (4.0 lb)  
Volume (cc): 650 (0.0230 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 300 (80.6° F)  
Minimum (°K): 277 (39.2° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 6

Total Redundant Elements (No.):

## Cost

Design Engineering (\$1000): 685.0

Test and Evaluation (\$1000): 196.0

Unit Production (\$1000): 69.0

Reference Quantity (No.): 2

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 3.7

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0218)  
Configurations: All  
Equipment Type: Battery cell

#### Performance

##### Technical Characteristics

(1)	Capacity:	65.0 amp-hr
(2)	Watt/hour charge efficiency (N. D.):	0.65
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	2.0 (4.5 lb)
--------------	--------------

Volume (cc):	670 (0.0236 ft <sup>3</sup> )
--------------	-------------------------------

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	300 (80.6° F)
Minimum (°K):	277 (39.2° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 3

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) NA

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.):

Total Redundant Elements (No.): 6

### Cost

Design Engineering (\$1000): 719.0

Test and Evaluation (\$1000): 209.0

Unit Production (\$1000): 72.0

Reference Quantity (No.): 2

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 6.9

Development Lead Time Variable (months): 4.0

Qualification Lead Time Constant (months): 2.1

Qualification Lead Time Variable (months): 0.4

State-of-Art Factor (N.D.): 1.0

Subsystem: ER (0301)  
Configurations: All  
Equipment Type: Battery Charger

#### Performance

##### Technical Characteristics

- |      |                     |           |
|------|---------------------|-----------|
| (1)  | Current rating:     | 10.0 amps |
| (2)  | Efficiency (N. D.): | 1.0       |
| (3)  |                     |           |
| (4)  |                     |           |
| (5)  |                     |           |
| (6)  |                     |           |
| (7)  |                     |           |
| (8)  |                     |           |
| (9)  |                     |           |
| (10) |                     |           |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA

Converter/Inverter  
Requirement (flag):

Weight (kg):	1.70 (3.75 lb)
Volume (cc):	$3.1 \times 10^3$ (0.11 ft <sup>3</sup> )

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	3
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	260
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	0
Test and Evaluation (\$1000):	0
Unit Production (\$1000):	0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	3.5
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (0302)  
Configurations: All  
Equipment Type: Battery Charger

#### Performance

##### Technical Characteristics

- (1) Current rating: 6.5 amps
- (2) Efficiency (N. D.): .1.0
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 1.66 (3.67 lb)  
Volume (cc):  $2.2 \times 10^3$  (0.076 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	3
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	260
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	0
Test and Evaluation (\$1000):	0
Unit Production (\$1000):	0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	3.5
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0



Subsystem: EP (0401)  
Configurations: Shunt and Discharge Regulation  
Equipment Type: Discharge Regulator

#### Performance

##### Technical Characteristics

- |      |                     |            |
|------|---------------------|------------|
| (1)  | Power capability:   | 59.0 watts |
| (2)  | Efficiency (N. D.): | 0.85       |
| (3)  |                     |            |
| (4)  |                     |            |
| (5)  |                     |            |
| (6)  |                     |            |
| (7)  |                     |            |
| (8)  |                     |            |
| (9)  |                     |            |
| (10) |                     |            |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	1.4 (3.0 lb)
Volume (cc):	$8.5 \times 10^3$ (0.3 ft <sup>3</sup> )

##### Vibration

Random (g, rms):	
Non-Random (g):	

##### Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	3
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	250
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	70.0
Test and Evaluation (\$1000):	70.0
Unit Production (\$1000):	25.0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	2.0
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (0501)  
 Configurations: Shunt & Shunt and Discharge Regulation  
 Equipment Type: Shunt Regulator

#### Performance

##### Technical Characteristics

(1)	Maximum power capacity:	62.0 watts
(2)		
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		

##### Power

Average Power (watts):	
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	2.0 (4.3 lb)
--------------	--------------

Volume (cc):	$1.2 \times 10^4$ (0.43 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms)	
Non-Random (g):	

##### Temperature

Maximum (°K):	373 (212° F)
Minimum (°K):	218 (-67° F)

Pressure (kg/m <sup>2</sup> ):	
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## Performance (continued)

### CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 2

#### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

#### Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

### Safety

Failure Model (flag): 1

#### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 200

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

### Cost

Design Engineering (\$1000): 80.0

Test and Evaluation (\$1000): 40.0

Unit Production (\$1000): 7.0

Reference Quantity (No.): 4

Factor (N.D.): 1

### Schedule

Development Lead Time Constant (months): 9.5

Development Lead Time Variable (months): 3.6

Qualification Lead Time Constant (months): 2.3

Qualification Lead Time Variable (months): 0.2

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0601)  
Configurations: All  
Equipment Type: Battery Charger  
Performance

Technical Characteristics

- |      |                    |           |
|------|--------------------|-----------|
| (1)  | Current rating:    | 10.0 amps |
| (2)  | Efficiency (N.D.): | 0.85      |
| (3)  |                    |           |
| (4)  |                    |           |
| (5)  |                    |           |
| (6)  |                    |           |
| (7)  |                    |           |
| (8)  |                    |           |
| (9)  |                    |           |
| (10) |                    |           |

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	3.2 (7.0 lb)
Volume (cc):	$4.2 \times 10^4$ (1.5 ft <sup>3</sup> )

Vibration

Random (g, rms):	
Non-Random (g):	

Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 6

### High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

### Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

### Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 650

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.1

Total Redundant Elements (No.): 4

## Cost

Design Engineering (\$1000): 0

Test and Evaluation (\$1000): 0

Unit Production (\$1000): 0

Reference Quantity (No.): 1

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months): 8.1

Development Lead Time Variable (months): 3.5

Qualification Lead Time Constant (months): 2.3

Qualification Lead Time Variable (months): 0.3

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0701)  
Configurations: Shunt and Discharge Regulation  
Equipment Type: Central Control Unit

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)

Volume (cc):  $2.8 \times 10^3$  (0.1 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 10

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 2

Digital Points (No.): 2

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr) 950

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

## Cost

Design Engineering (\$1000): 32.5

Test and Evaluation (\$1000): 32.5

Unit Production (\$1000): 11.5

Reference Quantity (No.): 1

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months): 8.1

Development Lead Time Variable (months): 1.2

Qualification Lead Time Constant (months): 2.3

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0



Subsystem: EP (0801)  
Configurations: Series Load Regulation  
Equipment Type: Series Load Regulator

#### Performance

##### Technical Characteristics

- |      |                     |             |
|------|---------------------|-------------|
| (1)  | Output power:       | 350.0 watts |
| (2)  | Efficiency (N. D.): | 0.9         |
| (3)  |                     |             |
| (4)  |                     |             |
| (5)  |                     |             |
| (6)  |                     |             |
| (7)  |                     |             |
| (8)  |                     |             |
| (9)  |                     |             |
| (10) |                     |             |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	0.73 (1.6 lb)
--------------	---------------

Volume (cc):	$7.4 \times 10^3$ (0.26 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms):	
------------------	--

Non-Random (g):	
-----------------	--

##### Temperature

Maximum (°K):	311 (100° F)
---------------	--------------

Minimum (°K):	266 ( 20° F)
---------------	--------------

Pressure (kg/m <sup>2</sup> ):	
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# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.): 6

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.): 3

Digital Points (No.): 1

Sample Rate ( $\text{sec}^{-1}$ ): 1

Word Length (bits): 8

## Safety

Failure Model (flag): 1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr): 650

Standard Deviation ( $\times 10^{\pm 9}$  hr):

Dormancy Factor (N.D.): 0.5

Total Redundant Elements (No.): 4

## Cost

Design Engineering (\$1000): 45.0

Test and Evaluation (\$1000): 45.0

Unit Production (\$1000): 16.0

Reference Quantity (No.): 1

Factor (N.D.): 1

## Schedule

Development Lead Time Constant (months): 8.1

Development Lead Time Variable (months): 1.5

Qualification Lead Time Constant (months): 2.3

Qualification Lead Time Variable (months): 0.1

State-of-Art Factor (N.D.): 1.0

Subsystem: EP (0802)  
Configurations: Series Load Regulation  
Equipment Type: Series Load Regulator  
Performance

Technical Characteristics

- |      |                     |            |
|------|---------------------|------------|
| (1)  | Output power:       | 225.0 watt |
| (2)  | Efficiency (N. D.): | 0.9        |
| (3)  |                     |            |
| (4)  |                     |            |
| (5)  |                     |            |
| (6)  |                     |            |
| (7)  |                     |            |
| (8)  |                     |            |
| (9)  |                     |            |
| (10) |                     |            |

Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA
Converter/Inverter Requirement (flag):	

Weight (kg):	3.6 (8.0 lb)
--------------	--------------

Volume (cc):	$8.5 \times 10^3$ (0.30 ft <sup>3</sup> )
--------------	---

Vibration

Random (g, rms):	
Non-Random (g):	

Temperature

Maximum (°K):	311 (100° F)
Minimum (°K):	266 ( 20° F)

Pressure (kg/m <sup>2</sup> ):	
--------------------------------	--

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	6
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr)	650
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	145.0
Test and Evaluation (\$1000):	145.0
Unit Production (\$1000):	51.5
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	3.3
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.2
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (0901)

Configurations: All

Equipment Type: Battery Charger

#### Performance

##### Technical Characteristics

- |      |                     |           |
|------|---------------------|-----------|
| (1)  | Current rating:     | 22.0 amps |
| (2)  | Efficiency (N. D.): | 0.85      |
| (3)  |                     |           |
| (4)  |                     |           |
| (5)  |                     |           |
| (6)  |                     |           |
| (7)  |                     |           |
| (8)  |                     |           |
| (9)  |                     |           |
| (10) |                     |           |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA

Converter/Inverter  
Requirement (flag)

Weight (kg): 3.6 (8.0 lb)

Volume (cc):  $8.5 \times 10^3$  (0.30 ft<sup>3</sup>)

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)

Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	6
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr)	650
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	0
Test and Evaluation (\$1000):	0
Unit Production (\$1000):	0
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	3.5
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (0902)

Configurations: All

Equipment Type: Battery Charger

#### Performance

##### Technical Characteristics

- |      |                     |           |
|------|---------------------|-----------|
| (1)  | Current rating:     | 12.0 amps |
| (2)  | Efficiency (N. D.): | 0.85      |
| (3)  |                     |           |
| (4)  |                     |           |
| (5)  |                     |           |
| (6)  |                     |           |
| (7)  |                     |           |
| (8)  |                     |           |
| (9)  |                     |           |
| (10) |                     |           |

##### Power

Average Power (watts):	NA
Maximum Power (watts):	NA
Minimum Power (watts):	NA
Nominal Voltage (volts):	NA
Maximum Voltage (volts):	NA
Minimum Voltage (volts):	NA

Converter/Inverter  
Requirement (flag):

Weight (kg):	0.64 (1.4 lb)
--------------	---------------

Volume (cc):	$8.55 \times 10^3$ (0.302 ft <sup>3</sup> )
--------------	---

##### Vibration

Random (g, rms):

Non-Random (g):

##### Temperature

Maximum (°K):	311 (100° F)
---------------	--------------

Minimum (°K):	266 (20° F)
---------------	-------------

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):

Time Tagged Commands (No.):

Other Commands (No.):

6

High Rate Telemetry

Analog Points (No.):

Digital Points (No.):

Sample Rate ( $\text{sec}^{-1}$ ):

Word Length (bits):

Low Rate Telemetry

Analog Points (No.):

3

Digital Points (No.):

1

Sample Rate ( $\text{sec}^{-1}$ ):

1

Word Length (bits):

8

## Safety

Failure Model (flag):

1

Failure Parameters

Failure Rate or Mean ( $\times 10^{\pm 9}$  hr):

650

Standard Deviation ( $\times 10^{+9}$  hr):

Dormancy Factor (N.D.):

0.5

Total Redundant Elements (No.):

4

## Cost

Design Engineering (\$1000):

0

Test and Evaluation (\$1000):

0

Unit Production (\$1000):

0

Reference Quantity (No.):

1

Factor (N.D.):

1

## Schedule

Development Lead Time Constant (months):

8.1

Development Lead Time Variable (months):

3.5

Qualification Lead Time Constant (months):

2.3

Qualification Lead Time Variable (months):

0.3

State-of-Art Factor (N.D.):

1.0



Subsystem: EP (1001)  
Configurations: Series Load Regulation  
Equipment Type: Solar Power Distributor  
Performance

Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)  
Volume (cc):  $2.8 \times 10^3$  (0.1 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	3
High Rate Telemetry	..
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	300
Standard Deviation ( $\times 10^{+9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	32.5
Test and Evaluation (\$1000):	32.5
Unit Production (\$1000):	11.5
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	1.2
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (1101)  
Configurations: Series Load Regulation  
Equipment Type: Power Distributor  
Performance

Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (flag):

Weight (kg): 0.45 (1.0 lb)  
Volume (cc):  $2.8 \times 10^3$  (0.1 ft<sup>3</sup>)

Vibration

Random (g, rms):  
Non-Random (g):

Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 266 (20° F)

Pressure (kg/m<sup>2</sup>):

## Performance (continued)

### CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	3.
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	3
Digital Points (No.):	1
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

### Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	300.
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4

### Cost

Design Engineering (\$1000):	32.5
Test and Evaluation (\$1000):	32.5
Unit Production (\$1000):	11.5
Reference Quantity (No.):	1
Factor (N.D.):	1

### Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	1.2
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.1
State-of-Art Factor (N.D.):	1.0

Subsystem: EP (1201)  
Configurations: Shunt Regulation  
Equipment Type: Power Control Unit

#### Performance

##### Technical Characteristics

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)
- (10)

##### Power

Average Power (watts): NA  
Maximum Power (watts): NA  
Minimum Power (watts): NA  
Nominal Voltage (volts): NA  
Maximum Voltage (volts): NA  
Minimum Voltage (volts): NA  
Converter/Inverter  
Requirement (ftol).

Weight (kg): 4.76 (10.5 lb)  
Volume (cc):  $6.2 \times 10^3$  (0.22 ft<sup>3</sup>)

##### Vibration

Random (g, rms):  
Non-Random (g):

##### Temperature

Maximum (°K): 311 (100° F)  
Minimum (°K): 266 ( 20° F)

Pressure (kg/m<sup>2</sup>):

# Performance (continued)

## CDPI

Power Switching Commands (No.):	
Time Tagged Commands (No.):	
Other Commands (No.):	4
High Rate Telemetry	
Analog Points (No.):	
Digital Points (No.):	
Sample Rate ( $\text{sec}^{-1}$ ):	
Word Length (bits):	
Low Rate Telemetry	
Analog Points (No.):	2
Digital Points (No.):	2
Sample Rate ( $\text{sec}^{-1}$ ):	1
Word Length (bits):	8

## Safety

Failure Model (flag):	1
Failure Parameters	
Failure Rate or Mean ( $\times 10^{\pm 9}$ hr):	421
Standard Deviation ( $\times 10^{\pm 9}$ hr):	
Dormancy Factor (N.D.):	0.5
Total Redundant Elements (No.):	4


## Cost

Design Engineering (\$1000):	175.0
Test and Evaluation (\$1000):	175.0
Unit Production (\$1000):	57.0
Reference Quantity (No.):	1
Factor (N.D.):	1

## Schedule

Development Lead Time Constant (months):	8.1
Development Lead Time Variable (months):	3.8
Qualification Lead Time Constant (months):	2.3
Qualification Lead Time Variable (months):	0.3
State-of-Art Factor (N.D.):	1.0

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